

**DEFINING THE EHEALTH INFORMATION NICHE IN THE FAMILY  
PHYSICIAN/PATIENT EXAMINATION AND KNOWLEDGE TRANSFER  
PROCESS**

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## **ABSTRACT**

**VIRGINIA BETH ELDER ELLINGTON: Defining the eHealth Information Niche in the Family Physician/Patient Examination and Knowledge Transfer Process**  
(Under the direction of Claudia Gollop, Paul Solomon and Barbara Wildemuth)

This research study was undertaken to gain a richer understanding of the use of patient-introduced online health information during the physician/patient examination and knowledge transfer process. Utilizing qualitative data obtained from ten family physician interviews and workflow modeling using activity diagrams and task structure charts, this study uncovered patient-introduced online health information frequency, physician suggested online resources, use of email for physician/patient communication, use of electronic medical records, along with tasks involved and methods used by the physicians to work the online health information into the physician/ patient examination process.

In addition the data analysis provided an understanding of the physicians' objectives and desired outcomes during the examination, their definition of patient health literacy and physician productivity values along with the tools, rules, community and division of labor utilized in their clinical practice. The study found the niche for eHealth information was in the "communicates with patient" subtask in the "physician examining patient" activity where it was used as a nontangible tool by the physicians. This research has theoretical relevance for those interested in how workflow can be modeled using activity diagrams and task structure charts, as well as practical applications for analyzing productivity improvement for clinical practices.

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## **Chapter I. RESEARCH OBJECTIVES**

### ***Introduction***

Research has shown that with the increased access to health information provided via the Internet, not only patients, but their healthcare providers, their caregivers and even healthy people are increasingly seeking health information online (Fox and Rainie, 2000). To better understand this trend in searching for health information online we must first define online health information. Online health information may be found from a variety of sources including government, educational institution, medical, non-profit and commercial web sites. For the purpose of this study online health information will be defined as health information contained in web sites that are freely accessible via the Internet and will hereafter be referred to as eHealth information. The individuals searching for eHealth information will be referred to as eHealth seekers. eHealth seekers use the Internet to obtain knowledge about a particular condition, disease or treatment method.

One factor that may be contributing to the rise in patients searching for eHealth information is the shortage of primary care providers, including family physicians and pediatricians, existing today in the United States (Freed and Stockman, 2009). Primary care provider shortages limit the time available for physician/patient examinations, knowledge transfer and communication about diseases or conditions. Knowledge transfer

is needed to empower patients to make better decisions about their healthcare. Since physician's time is a finite resource, after completing the necessary patient care activities, the scarcity of this commodity can restrict the physician's ability to thoroughly discuss online health information brought to the examination by the patient, thus inhibiting knowledge transfer (Dugdale, Epstein and Pantilat, 1999).

The continued practice of health insurance companies requiring patients to visit their primary care provider, family physician, internist or pediatrician, prior to visiting a specialist may also be contributing to the increase in online health information seeking as patients are trying to minimize insurance co-pays due to their economic situation. If the patient is insured, able to afford their insurance co-pays and visit their doctor, the quality time spent between physician and patient is best utilized developing the physician/patient relationship and discussing treatment options, leaving little time to address the components of care adversely affected by time constraints such as chronic disease outcomes and risks associated with malpractice claims.

Traditionally the preferred sources of information for medical professionals to educate their patients about personal health conditions have been physician/patient examinations, consultations, medical journals, medical encyclopedias and medical dictionaries. These health information sources are considered reliable, trustworthy and credible by both medical professionals and patients. However, these information sources have time, cost and geographic access limitations, as well as, barriers to use for patients

due to health literacy levels and their inability to effectively communicate with their healthcare providers (McKenzie, 2002).

Health information seeking is not a new patient practice but one that has been enhanced through the 24/7 convenient availability of eHealth information. The ability to access eHealth information from home, work or school and with mobile devices, such as smartphones and tablets, has magnified the access limitations of traditional sources of health information by providing the technology for collaboration between patients, doctors and caregivers via websites and email, and enabled patients to self-educate and form online support communities (Keselman, Logan, Smith, Leroy and Zeng-Treitler, 2008). This rise in patients seeking eHealth information may also be attributed to the increased integration of online information into our everyday lives coupled with the patient's thirst for knowledge about a condition or treatment options affecting their family (Ahern, 2007). Whatever the reasons, it appears patients are turning to the Internet to find the answers to their health questions and rapidly displacing traditional health information sources by introducing eHealth information into the physician/patient examination process (Ahmad, Hudak, Bercovitz, Hollenberg and Levinson, 2006).

Patients' health literacy levels and their inability to effectively communicate with healthcare providers are barriers that have not been overcome by using eHealth information (Keselman et al., 2008). Health Literacy is defined by the Centers for Disease Control and Prevention, as the capacity to obtain, process, and understand basic health information and services to make appropriate health decisions (Centers for Disease

Control and Prevention, 2011). According to the National Action Plan to Improve Literacy, quality of clinician–patient communication can affect patient health outcomes, including how well patients follow instructions from clinicians, but few health care professionals receive formal training in communication, particularly in working with people with limited literacy (U.S. Department of Health and Human Services, 2010).

The expectation of this wealth of online knowledge was that empowered patients would make better decisions about their health treatment, thus improving their health outcomes. But are health information web site visits a viable solution for patients and physicians to utilize to alleviate some of the inefficiencies in the U. S. healthcare system today? If so, how does eHealth information fit into the physician/patient knowledge transfer process, without decreasing the physician’s workflow efficiency, to empower patients in their medical decision making process? It appears that the jury is still out as to whether this form of readily available health information is a help or a hindrance to improving patients’ understanding of their health condition or enhancing physician/patient communication. In addition the probability of a patient obtaining potentially harmful information that may delay or impede their treatment is a serious concern for all.

Finding a way to utilize this eHealth information, to increase the effectiveness, and thus the quality, of the knowledge transfer process between patients and physicians, could be a major step in optimizing examination and consultation productivity (Ahmad et al., 2006). Studies have shown that increasing productivity increases the capacity to see

more patients and collect additional revenue. This strategy for increasing patient volume in the “fixed cost” world of primary care practices can prove to be a highly profitable strategy for physicians to increase their revenues (Rauh, Wadsworth, Weeks and Weinstein, 2011).

Although eHealth information, in theory, was created to empower the patient in their healthcare decision making, can it not also be utilized to empower physicians and enhance their knowledge transfer processes? So how does eHealth information fit into the physician/patient examination activity? Does eHealth information efficiently adapt to the physician’s workflow? Or does it impede the knowledge transfer process due to varying levels of the reliability, trustworthiness and quality of the information patients are discovering online? Is this information wasting valuable physicians’ time and potentially undermining the patients’ medical treatment by causing the physicians to explain how it relates or does not relate to their disease or condition? Where is the niche for eHealth information in the medical treatment process? How can these questions best be answered? The answers may best be found by asking the physicians how it fits into their clinical workflow.

Workflow, in the workplace, is generally defined as the process by which tasks are done, by whom, in what order and how quickly. Results of studies analyzing medical practice workflow suggest that the physician’s time is best spent performing tasks that only the physician can do, such as treating patients. Other tasks are best delegated to staff in order to maximize medical practice workflow (Aarts and van der Sijs, 2009). The

physician/patient examination is one of those tasks that only the physician should do and during the examination is where physician/patient knowledge transfer is most likely to occur. The physician/patient knowledge transfer process supports the communication of vital information about the patient's health concern from both the physician to the patient and the patient to the physician to improve patient health literacy.

One method often used to evaluate workflow is time studies. Time studies time worker's performance to develop standards for completing various tasks (Taylor, 1911). Another method used to evaluate workflow is process modeling. Workflow is modeled by creating a process diagram. A process diagram contains a set of core actions or tasks which are critical to completion of the process (Chapanis, 1959). Other techniques utilized to evaluate work processes are socio-technical methods, activity diagrams and task structure charts.

Socio-technical methods study people, technology and organizations from a single theoretical framework using ethnographic and participatory action methods (Trist and Murray, 1990). Activity diagrams model the three-way interaction between those who perform an activity, the person place or thing to which the activity is directed and their community of co-workers. Activity diagrams provide a descriptive framework for analysis of work activity and the evaluation of technologies used in work settings (Engeström, 1987). Task structure charts are used to analyze work by breaking down tasks needed to accomplish an activity into subtasks and sub-subtasks. This method is used to visualize steps in a work process and the order in which they are performed. Once

visualized, the process is then analyzed for process improvement opportunities (Preece, Rogers and Sharp, 2002).

When using these methods to study clinical workflow and work processes, theoretically, the proper identification and correction of workflow and process issues found, should improve the physician's efficiency and effectiveness by improving patient flow and minimizing physician downtime (Brooks and Griffin, 2010). Activity diagrams are often used (Engeström, 2000) to study work redesign in the healthcare field. Activity diagrams were used in this study in conjunction with task structure charts because they provided a theoretical framework to better analyze the physician examining patient activity.

This study was conducted to define the eHealth information niche in the physician examining patient activity by analyzing physician interview transcripts, activity diagrams and task structure charts to answer the following research questions:

1. How does the introduction of eHealth information into the family physician/patient examination process impact clinical workflow?
2. What are the potential barriers, challenges or improvements to physician/patient examination and communication effectiveness created by patient eHealth information introduction?

3. What process improvements or best practices may be developed to better manage patient-introduced eHealth information that could enhance the productivity of the physician examining patient activity?

The following literature review answers the questions of who, what, where, how and why of eHealth information seeking and illustrates the need for studies, analyzing clinical workflow, to better define “when” eHealth information is introduced by patients and its effect on the physician/patient examination activity. This dissertation defines the niche for patient-introduced eHealth information by determining when eHealth information is introduced in the physician examining patient activity and by describing its effect on physician/patient communication and physician productivity.



## **Chapter II. REVIEW OF THE LITERATURE**

### ***Defining the niche***

Niche is a term defined in general as the place where a thing best fits. A niche may be transient or permanent but when used in the technological sense it is defined as the place a particular technology best fits in a business process to solve a problem identified but not solvable within the current process. Niche formation therefore occurs when there is a void to fill in a process that in turn drives the development of new technologies to fill the void (Kemp, Schot and Hoogma, 1998). The eHealth information niche is therefore defined as the best fit for eHealth information to fill a perceived process shortcoming or void in the physician/patient examination and knowledge transfer process.

A study analyzing data from the Health Information National Trends Survey (HINTS) (Nelson, Kreps, Hesse, Croyle, Willis and Arora, 2004) found that of the U. S. adults reporting use of the Internet, 63% had looked online for health information at least once during the previous year. In spite of this trend most surveyed felt physicians were their most highly trusted source for health information. However, even though physicians were their most trusted sources, 48% reported they actually went online first to find health information with only 10% going to their physician first (Hesse, Nelson, Kreps,

Croyle, Arora, Rimer and Viswanath, 2005). If the eHealth seekers consider their doctors their most trusted source for health information then why are 48% of them going online instead of communicating with their doctors?

To better understand eHealth seeking behavior, this literature review characterizes eHealth seekers by answering the following questions:

- Who is seeking eHealth information?
- What are they looking for online?
- Where are they looking for eHealth information?
- Why are they looking for eHealth information?
- How are they evaluating the eHealth information they find?

This characterization of the eHealth seekers should provide insight into defining the eHealth information niche in the physician/ patient examination process and provide an answer to the following question:

- When is eHealth information introduced in the examining patient activity?

### ***Who is seeking eHealth information?***

The Pew Internet & American Life Project study (Fox and Rainie, 2000), which collected data about how the web helps Americans to improve their health, found that 55% of Americans with internet access had used the web to access medical information, and of those 48% stated the advice they found had improved the way they took care of themselves. In addition, 20% stated such information influenced their decision about how

to treat an illness or condition, 50% stated that this information found via the web led them to ask a doctor new questions or obtain second opinions, and 28% stated that the information they found affected their decision about visiting a doctor.

The Fox and Rainie (2000) study results indicated that women were more likely than men to be eHealth seekers. However, men were more likely than women to look for information on their own condition and to report that their search affected their decisions about how to treat the illness. The seeking of health information in the study was comparable for all racial and ethnic groups. In addition, there was no correlation with household income.

The Fox and Rainie (2002) study found that 61% of eHealth seekers stated the Internet had improved the way they had taken care of their health. This is a significant increase from the 48% found in the 2000 study. In addition 33% knew someone who had been helped by following medical advice or health information they found online, while just 2% knew someone who had been seriously harmed by following the health information they found. Of the eHealth seekers, 16% stated the information had a major impact on their health care, 52% stated it had a minor impact, and 31% stated it had no impact at all. Two follow-up studies (Fox, 2005; Fox, 2006) demonstrated that utilizing the Internet to access eHealth information had held at 80%, and that the majority of the eHealth seekers were women.

Caregivers, nurses and home health service providers are also searching for eHealth information to support their work or make them feel “less alone” when taking care of patients. A study conducted by Alexander and Zeibland (2006), to evaluate use of the Internet by caregivers, found there was a need for physicians to recognize that many patient care providers treat the Internet as a source of health information and therefore it is important that healthcare professionals are aware of what is available, familiarize themselves with it and are able to provide information about online health resources as part of their provision of care. The study emphasized that health care professional education must prepare physicians and other health care professionals to provide patients with health information and perhaps these health care professionals could provide an “information prescription” for suitable eHealth resources.

Studies that address specific populations have also been conducted to determine who uses eHealth information for specific diseases and conditions. These studies have involved cancer patients, patients with stigmatized diseases, the uninsured, seniors and adolescents (Gray, Klein, Noyce, Sesselberg and Cantrill, 2005). These studies have found that individuals with reported chronic conditions were more likely than those without to search for eHealth information. The uninsured, particularly those with a chronic health condition, were more likely than the privately insured to search. Individuals facing significant barriers to accessing healthcare in traditional settings, such as those with longer travel times for their usual source of care, were also more likely to use the Internet to find health-related information (Bundorf, Wagner, Singer and Baker, 2006).

A study by Cotton and Gupta (2004), which was conducted to determine the characteristics of online and offline health information seekers, found that eHealth seekers are significantly more likely to be younger, have higher incomes, and be more educated than offline health information seekers. Forty-two percent of the eHealth seekers reported spending more than three hours per week using email, compared to only 15% of offline health information seekers. In addition, eHealth seekers were more likely to report using the Internet for purposes other than email. The eHealth seekers reported better well-being when assessed through self-reported health status and general happiness, which indicated they were more likely to be healthier and happier than the offline health information seekers. In addition 86% of the eHealth seekers group self-reported that their health status was good or excellent, compared to only 60% of the offline group.

These studies found that eHealth seekers were predominantly women with a family health concern, caregivers, those with chronic health conditions, the uninsured or those with significant barriers to healthcare access who perceived the use of eHealth information as a tool to improve their health literacy. When compared to offline health information seekers, eHealth seekers were more likely to be frequent users of other forms of online information, younger, better educated and earned higher incomes. However there was no differentiation between racial and ethnic groups for eHealth seekers.

### ***What are they looking for online?***

A Fox and Rainie (2000) study found that eHealth seekers also used the Internet to get information about an immediate health problem after they had been to a doctor. Ninety-one percent of eHealth seekers were looking for information related to a physical illness, 20% had looked for mental health information, 54% were seeking information on behalf of a loved one and 43% were seeking information on behalf of themselves. Women were twice as likely as men to be seeking information for a child. The study found little evidence related to a concern of the medical establishment that patients are self-diagnosing and self-medicating with eHealth information. Only 18% stated they had gone online to diagnose or treat an illness on their own without consulting a doctor, while 37% stated they talked to a doctor or healthcare professional about the eHealth information they found. In addition, 79% stated their doctor was interested in the eHealth information they found while just 13% stated their doctor was not interested. Of those who chose not to talk to a doctor most deemed the topic too insignificant while only 2% did not talk to their doctor because they did not think their doctor would listen.

A follow-up study by Fox and Rainie (2002) found that 93% of the survey respondents were looking online for information about a particular illness, while 65% were looking for information about nutrition, exercise or weight control, an increase from 13% in the 2000 study. Sixty-four percent were looking for prescription drug information and 48% were looking for alternative or experimental treatments. Sixty-two percent of those treated for a serious illness in the past year were more likely to seek alternative or

experimental treatment eHealth information because they were looking for ways to treat the illness without medication or they felt that most doctors were not up to date on alternative methods. Thirty-nine percent of the respondents were looking for information about mental illness and 33% had looked online for information about a sensitive health topic. Follow-up studies demonstrated the majority of female respondents were looking for information for a specific disease or medical condition that affected them or a family member (Fox, 2005; Fox, 2006).

Another study by Franck, Noble and McAvoy (2008) analyzed online health topics requested at a children's health information site and found that children and adolescents are active users of the Internet for health information. The most common topics requested were subjects that could be potentially embarrassing or stigmatizing such as psychosocial and developmental issues. Requests for information regarding hospital procedures or health service information were also common from children and adolescents. This study stressed the importance of children and adolescents as eHealth seekers and the need for designing eHealth information in a variety of media formats to improve its effectiveness as a preventative healthcare intervention tool for this population group to support better patient health literacy.

These studies found that eHealth seekers were looking online for information about a family health concern, prescription drugs, stigmatized illnesses, alternative medicine or experimental treatments. The studies also found that patients were not self-

diagnosing or self-medicating with eHealth information and that most discussed the information found with a healthcare professional.

### ***Where are they looking for eHealth information?***

The search strategies of the survey respondents in Fox and Rainie's (2002) study were categorized as going it alone by using a search engine and visiting multiple sites, or consulting one favorite site. Eighty-six percent of the survey respondents chose to go it alone by starting at a search engine and visiting multiple sites, with the typical range of sites visited being two to five. Those who used search engines were more interested in getting the information quickly than finding a trusted source. Just 8% stated that they were more likely to start at a specialized site like WebMD. Twenty-nine percent actually bookmarked health related websites. Of those who bookmarked, most had seen a doctor during the past year and 14% stated that they had a favorite site such as WebMD, Mayo Clinic, National Institutes of Health, IntelliHealth, Medline or DrKoop.com. Twenty-five percent stated they went to a favorite site because of a personal recommendation, 25% saw an advertisement for the site, 25% found it through an internet search, and 12% came across it while surfing the web. Additional studies found frequent use of the Internet to access eHealth information by 80% of the respondents (Fox, 2005; Fox, 2006).

A study (Elkin, 2008) conducted by Opinion Research Corporation interviewed and surveyed adults in the United States to determine what health information resources consumers prefer and trust, and what health topics they regularly search for online .



General search engines were used most often to search for online health information at 67%, while health portals had the second highest percentage at 46%. Women were more likely to use health portals than search engines or healthcare provider sites. The study emphasized that this practice should be expected since health portals are established and trusted online tools. Conversely the respondents stated that pharmaceutical companies and television were the least two trusted resources for health information. Respondents aged 55 to 64 continued to rely on their doctors for authoritative and trustworthy health information. Those over 65 were least likely to rely on information obtained from the Internet. The respondents in the 45 to 54 year old age group had the lowest usage of online health information while the 18 to 34 year old age group was most likely to search online for health information. This indicates that those less than 34 years of age are more likely to use “nontraditional” health information resources.

Accessing health information using search engines and simple search terms is not always the best or most efficient process. Berland, Elliott, and Morales (2001), utilized fourteen search engines in a structured search experiment to find health information web sites that were then evaluated for their quality by physicians. The study found that coverage of key information on both English and Spanish language web sites was poor. The accuracy of the information that was available was generally good but high reading levels were required to comprehend the web-based health information, indicating the literacy level of the eHealth seekers may be an obstacle when the technical/medical language of the information is beyond their understanding.

A study conducted by Microsoft® Research (Horvitz and White, 2008) found that there is an abundance of health information to be found on the web but that “cyberchondriacs” searching for this information via search engines are not necessarily finding the best health information in their results. This study found that most often the “worst case” scenario for the disease or condition is retrieved by the user in the search results. This study indicated that when eHealth seekers are searching for reliable sites the credibility of the information being obtained online is a legitimate concern for both patients and physicians.

Capstrat and Public Policy Polling (Eudy, 2010) conducted a national survey that found respondents considered doctors to be their most reliable and most influential sources for health information. However the study also found the second most influential source of health information to be Google™ searches. This study suggests that patients still consider doctors their first choice for health information but that health information found via search engines influences their health care decisions.

This trend in finding eHealth information via search engines exposes another potential problem with the limitations of search engine query formulations by eHealth seekers. Keselman, Browne and Kaufman (2008) tested the hypothesis that access to quality eHealth resources empowers patients through increased knowledge and improved decision-making. The study found that when using search engines to seek eHealth information even the “internet-savvy” user experiences roadblocks due to information overload and the technical/medical language of the information.

These research studies demonstrated an increase by patients in utilizing the Internet to obtain health information and an increase in using the eHealth information found to supplement their patient educational needs (Keselman, Logan, Smith, Leroy and Zeng-Treitler, 2008). They also demonstrated that Americans rely mostly on search engines followed by health portals to find eHealth information. These studies rely more heavily on determining user behavior through their searching activities than through determining whether the web sites found via search engines actually contain reliable and trustworthy health information. Further studies need to be conducted that focus on the reliability and trustworthiness of eHealth information retrieved via search engines. The challenge for the healthcare community is to recognize that this search engine mentality is occurring and to convince the eHealth seeking community that “Googling” alone will not improve their health per se.

### ***Why are they seeking eHealth information?***

The reasons given for searching online for health information in the Pew Internet & American Life Project 2000 (Fox and Rainie, 2000) study were that the information was always available, and that eHealth seekers appreciated the convenience of the Internet. Women were seeking the information to self-educate but they were concerned about the unreliability of the eHealth information found. Men were searching for eHealth information because they were more privacy conscious and anxious to protect their health privacy.

A study conducted by Houston and Allison (2002), comparing use of eHealth information to differences in health status, found that patients with fair to poor health or “sicker” patients were more likely to search for eHealth information about their particular disease than “healthier” patients. The study found that the lower health status of patients, the more frequently they searched online for specific physicians, hospitals, medications and treatments. The patients with poorer health were more likely to talk to their doctor about it, indicating that physicians should anticipate that patients with chronic illnesses are more likely to present information found online during examinations. The study also indicated that when the “sicker” patients were newcomers to the Internet they may be more vulnerable to potentially harmful eHealth information. This study also suggested that the physician/patient examination should be used as an opportunity for physicians to educate these patients and direct them to higher quality eHealth information.

Herzlinger’s (2004) study found that eHealth seekers are motivated by the three C’s, Convenience, Control and Choice. Convenience minimizes their loss of time and money waiting for doctors’ appointments, missing work and depleting their sick benefits. Control allows them to play a role in their own healthcare. Choice includes choice of healthcare services, treatments and products. eHealth seekers rely on the Internet to provide these three C’s and in turn improve the efficiency, effectiveness and quality of their own healthcare thus minimizing the rising cost of their healthcare. This study also indicated that the cost of healthcare influenced patient’s interest in eHealth information.

Patients are seeking eHealth information for disease management (Eng, 2005; Meischke, Eisenberg, Rowe and Cagle, 2005). Studies have shown that information tailored to the patient's particular disease or condition is more likely to be viewed as personally relevant and is therefore more likely to be used (Brug, Glanz, Van-Assema, Kok and Van Breukelen, 1998). Other studies indicated positive health outcomes and behavior change when eHealth information is utilized in online smoking cessation programs (Lenert, 2004; Cobb, Graham, Bock, Papandonatos and Abrams, 2005) and obesity interventions (Tufano and Karras, 2005).

There are also societal changes influencing the rise in eHealth information seeking. Patients may have a stigmatized illness, such as a sexually transmitted infection, and the Internet allows them to maintain their anonymity when searching for health information (Berger, Wagner and Baker, 2005). However, some studies (e.g., Ziebland, 2004) indicate that people with life-threatening illnesses are more likely to have a different relationship with both their doctors and eHealth information than those with minor illnesses. Patients with chronic conditions were also more likely to develop expertise in their own condition through eHealth information seeking.

Diaz, Ng, Reinert, Friedmann, and Moulton (2002) studied established patients' use of the Internet for medical information and found they were using the Internet to find information on a variety of health topics including treatment side effects, complementary and alternative medicine, second opinions and specific diagnoses. However, the majority

of those patients felt that they were accessing reliable information and did not share it with their doctors.

Personal, social and cultural factors may determine the use of the Internet as a preferred source of personal health information. A study by Lemire, Paré, Sicotte and Harvey (2008) found that use was directly associated with five factors: perceived usefulness, importance given to written media in searches for health information, concern for personal health, importance given to the opinions of physicians and other health professionals, and the trust they placed in the information available on the site itself.

Zeng, Kogan, Plovnick, Crowell, Lacroix and Greenes (2004) found that even well educated individuals with access to health care providers found their health information needs more difficult to address through traditional channels, such as physician/patient consultation, so patients used eHealth information to supplement their knowledge and maintain their health autonomy. This study also found that even though the eHealth seekers had a positive attitude toward the eHealth information they found via search engines, their specific queries were often unsuccessful. This study suggests that eHealth information could be used to transform the provider/patient relationship by creating an opportunity for doctors to support a shared health decision making process and to mediate health information channels by recommending web resources for patients.

These studies found eHealth information use provided convenience, control, choice, anonymity and autonomy for patient disease management. The studies also found

that patients with life-threatening illnesses who have a longitudinal physician/patient relationship were more likely to talk to their doctor about the health information they found.

***How are they evaluating the eHealth information they find?***

Those seeking eHealth information have developed many ways to find this information online and to evaluate its usefulness and reliability (Morahan-Martin, 2004). This trend in eHealth information seeking has fueled a multitude of web sites being mass-produced by everyone from practitioners, librarians, and support group bloggers to pharmaceutical companies and attorneys. Recognizing the trend in eHealth information seeking, and in an attempt to create some legitimate guidelines for an overabundance of online health information, the World Health Organization convened a committee in 2005 to develop and maintain defined quality standards for eHealth information production (World Health Organization, 2005).

The Pew Internet & American Life Project studies relating to eHealth information seekers have also consistently characterized the need for reliable, authoritative, factual and trustworthy eHealth information or information that adheres to the quality standards defined by the World Health Organization. The respondents in the 2000 study were categorized into three groups depending upon their degree of verifying the credibility of eHealth information. Twenty five percent were vigilant about verifying site information, another 25% were concerned about the quality but more casual about verifying site

information, and 50% relied on their own common sense and rarely verified site information. Those who did verify checked the source of the information, the date when it was posted or the site's privacy policy (Fox and Rainie, 2000).

Possible reasons respondents stated for rarely verifying the credibility of the site information were they believed all or most of the health information they found online, they had not seen any wrong or misleading eHealth information, or they had not actually found "bad" eHealth information. However, even with 50% of respondents rarely verifying results, there were still 73% of the respondents who had at some point rejected eHealth information found (Fox and Rainie, 2000).

The major reasons given for those rejecting eHealth information were the web site was too commercial, there was no way to determine the source of the eHealth information, there was no "last updated" date for the web pages, there was no visible seal of approval on the site, there was a disorganized web site design or there was the presence of "bad" information on the site. Most of these eHealth seekers did not follow protocols established for verifying that the information was factual and not biased or opinionated. Since most believed that the information was reliable, if it agreed with what they already knew, they believed it, and when they read the same health information at different sites their trust in those sites increased. This process could create a potentially harmful practice of self-verification of eHealth information with no medical verification (Fox and Rainie, 2000).



Due to the risk of distributing potentially harmful health information online, quality management of health information should be a goal of anyone who publishes eHealth information (Frické, Fallis, Jones and Luszko, 2005). Eysenbach (2000) found this could be achieved by following the four E's: Educating consumers, Encouraging self-regulation of health information providers, Evaluating information by third parties and Enforcement in case of fraudulent or harmful information. Educating consumers may be achieved by teaching them to identify the source of the information, potential bias and date created. Encouraging self-regulation could be achieved by adhering to an eHealth Ethics Code. Evaluating information by third parties could be achieved by using a certification and rating system for filtering health information. Enforcement of fraudulent or harmful information could be monitored by government entities such as the Federal Trade Commission that facilitate filing complaints for illegal or fraudulent claims on the Internet.

Cline and Haynes (2001), in a study conducted by the Department of Health Science Education at the University of Florida, identified the concerns, benefits and criteria for evaluating eHealth standards. Their study reinforced the need for quality standards, and suggested that the quality of health information web sites should be subjected to the same standards as traditional information, which includes the credible sources of information such as: journals, universities, recognized research centers, libraries, government agencies and professional organizations. Credibility of eHealth information using this criteria would then be defined in terms of authoritativeness, trustworthiness, competence and expertise.

The Cline and Haynes (2001) study also produced indicators of accuracy to assess authoritativeness and trustworthiness of consumer health resources on the Internet, finding that evidence to assess authoritativeness should include, clearly identified authorship, attribution, and clearly identified editorial practices. Evidence of monitoring links to other sites and evidence to assess trustworthiness should include disclosure of mission, purpose, process and standards, disclosure of potential conflicts of interest, disclosure of collection process, use and final destination of information gathered, and disclaimers. The study suggested that the user be wary of health information web sites with “sounds too good to be true” claims, and that the web site should also be checked for currency of information, accuracy of information, organization of information, readability and intelligibility. The design of the web site should be geared toward its target audience for accessibility, ease of use, links between sites, aesthetics and format characteristics. The study concluded by suggesting three easy ways to evaluate health information web sites through peer review, rating systems and display of the HONcode logo.

The HONcode logo is the symbol of accreditation by the Health on the Net Foundation for health related web sites. The HONcode standard accreditation is based on the following eight ethical standards or principles for online health information: Authoritative, Complementarity, Privacy, Attribution, Justifiability, Transparency, Financial Disclosure and Advertising Policy (Health on the Net Foundation, 1997). Displaying the HONcode logo, however is not a “cure all” since it is easily copied and fraudulently displayed by web publishers, misleading eHealth seekers into believing that the web sites are accredited when they actually are not. The eHealth seekers must be

educated to click on the HONcode logo to make sure the accrediting information is accurate (Eysenbach, 2000).

Medical librarians suggest that eHealth seekers ask themselves the following questions to determine the quality and credibility of eHealth information. Who is behind the information on the site? Who pays for the site? Where does the information on the site come from? What kind of evidence supports the information on the site? How is the information selected? Is the information current? Who is the intended audience? What is the site's privacy policy? Is there a way to contact the owners of the site? In addition, medical librarians suggest patients should look for verifiable medical evidence such as published studies in peer-reviewed journals to support claims of improved health benefits of a product, service or treatment. Information about the medical expertise of the people who select, prepare or review the material for the site should be available. Information seekers should look for the site's selection criteria. Health information is constantly changing. An “updated on,” “page modified,” or “last review” date can often be found at the bottom of the page. If this date is not included, users or visitors to the site should look for a copyright line and evaluate the message and readability of the material on the site. Many health sites have separate areas for consumers and health professionals and some have information available in other languages. Web site users should have their confidentiality and privacy respected. Some sites may ask users to “register” or “become a member.” So patients should consult the privacy policy to see how the site will use their personal information collected and look for a way to contact the site owner or webmaster for further information (Silbajoris, 2009).

Eysenbach and Köhler's (2002) study to determine how consumers search for and evaluate eHealth information used focus groups and usability testing to describe techniques for retrieval and appraisal of health information. The participants utilized eight search engines to retrieve eHealth information and their strategies were evaluated. The study found that eHealth seekers were successful in finding health information but explored only the first few links in the results sets. The eHealth seekers looked for the credentials, qualifications and authority of the source, a professional design characterized by readability, layout and appearance, lack of advertising, contact information and trustworthy outbound links to assess the credibility of the site. They did not however check the "about us" section of websites or read disclaimer statements, and very few remembered the specific web sites where their information was located or who created the sites.

The use of search engines to find eHealth information has created awareness in the web design industry of utilizing methods that force the "rise to the top" of the search results sets of trustworthy and reliable health information sites. This research suggests that improving the search engine ranking of the most common health conditions in search engine results optimizes the quality of the health information displayed to the user (Horvitz and White, 2008). The implication is that a manipulation of the rankings based on the users' search activities may be used to include appropriate health information in their search results.

Google™ has decided to get into the health information game by manipulating the rankings for health information sites such as A.D.A.M., MedlinePlus, WebMD and Mayo Clinic to be featured in Google Health's One Box. OneBox offers users one source from a government health agency, a medical institution and a commercial site. None of the sites are paying to be included in this feature according to Google Health's Roni Zeiger (Fox, 2010). However, the OneBox selection criteria are contrary to suggested guidelines created by Silbajoris (2009) and the Health on the Net Foundation (1997) for evaluating online health information and may be perceived as allowing search engines to "practice medicine without a license."

Patients should be given the opportunity to assess the eHealth information they find, but at the same time the disseminators of eHealth information have a responsibility to provide patients with quality eHealth information (Walji, Sagaram and Sagaram, 2004). Reliable health information is produced by reputable sources such as government agencies, medical organizations or nonprofit organizations. Support or sponsorship for the web site should be clearly stated to determine whether there is the possibility of bias present in the information on the site. In addition eHealth seekers should look for information written by trained healthcare professionals with clearly stated credentials (Brann and Anderson, 2002).

Patients and eHealth seekers should be leery of search engines results that are automatically pushed to the top especially when both the WebMD and Mayo Clinic web sites contain advertisements for drugs to treat the disease and condition displayed on their

web pages (Atwood, 2009; Mayo Clinic, 2010). Paid sponsorships may create bias for the site to promote a particular type of treatment and any bias such as sponsorship of a web site or magazine produced by the web site should be clearly stated so that the patient is fully aware of potential bias (Atwood, 2009; Silbajoris, 2009). Potentially harmful medical information may be obtained online when patients are unaware of methods to evaluate eHealth information for its reliability and trustworthiness (Bernstam, Shelton, Walji and Meric-Bernstam, 2005).

These studies indicated a need for eHealth seekers to develop skills to better evaluate health information web sites for potentially harmful and erroneous medical information. These studies also indicated the need for healthcare providers to recommend “quality” sites to their patients so patients do not rely on search engine algorithms for their “quality” evaluations.

***When is eHealth information introduced in the examining patient activity?***

A study of primary care working conditions, and how they relate to quality of care, found that physicians who reported their workflow as time pressured during physical examinations and follow-up appointments were more likely to report job dissatisfaction, stress, burnout and intent to leave their practice. Though the findings did not indicate that dissatisfaction with working conditions affected patient safety and quality of care, the results did indicate that the physicians who experienced higher work control, lower work pace and whose values were more in line with the organizational

culture of their practice had higher overall job satisfaction (Linzer, Manwell, Williams, Bobula, Brown, Varkey, Man, McMurray, Horner-Ibler and Schwartz, 2009). This indicates a direct correlation between control of workflow and job satisfaction for primary care physicians.

Wensing, Wollersheim and Grol (2006) found when patient care was reorganized by implementing strategies that focused on improving knowledge management, attitudes and behaviors of healthcare workers improved, resulting in better patient outcomes. The study suggested that reorganization activities should include using computer systems for knowledge management, revising professional roles or working in multi-disciplinary teams to improve performance. Studies to determine the best dissemination and implementation strategies to enhance the quality of physician/patient knowledge transfer for interventions and preventative care found that when computers were utilized during consultation, physician performance improved, but consultation time increased and patient-initiated social contact decreased. However, patient education and knowledge transfer via interactive computer information systems and mass media campaigns increased use of preventive care, health interventions and healthcare services (Grimshaw et al., 2001). Another study by Tang and Lansky (2005) found electronic medical records systems facilitated knowledge transfer and physician/patient information sharing by allowing both to store their health information in one location for easy access and updating. These studies demonstrate the benefits of improved knowledge transfer and information management for better patient outcomes and use of preventative care, interventions and healthcare services.

## ***eHealth Information and Physician Workflow***

Studies analyzing physician workflow in a clinical setting have identified three distinct units of work: admission, diagnostic and therapy/discharge. The physician/patient consultation process occurs in the diagnostic work unit. The activities in the diagnostic work unit include the doctor examining the patient's history or records, the doctor examining the patient, discussing with patient, consulting with other physicians, referring to other doctors, scheduling lab tests and other diagnostics. The physician/patient consultation process is defined only as discussion with patient. Often this activity includes information in written, oral and/or electronic formats. Facilitation of flow of this information improves the knowledge transfer process. Modeling the workflow process should provide insight into the best way to facilitate the flow of this information without reducing efficiency (Mueller, Ganslandt, Frankewitsch, Krieglstein, Senninger and Prokosch, 1999).

Few studies have been conducted to determine the role of the Internet in physician/patient examinations and consultations, and even fewer have been conducted to capture the physicians' viewpoint. Ball and Lillis (2000) conducted a study to better understand how eHealth information had transformed the patient/physician relationship. They found that physicians needed to be more aware of the use of eHealth information by their patients and to define action items to help them and their patients realize the benefits of eHealth information. Suggested action items included: recommending appropriate web



sites to patients, creating their own web sites or utilizing email to communicate with patients.

Kreuter and McClure (2004) conducted a study that determined that culture played a vital role in the effectiveness of health communication. Effective health communication could be better achieved when health professionals segmented the population into subgroups and then utilized targeted health communication programs. By treating eHealth information seeking patients as a population subgroup, and utilizing traditional source factors (credibility, expertise and trustworthiness), message factors (content and structure) and channel factors (internet), physicians could develop a targeted health communication model tailored to their patients' needs.

Similar conclusions to those drawn in the Ball and Lillis study were reported by Ahmad, Hudak, Bercovitz, Hollenberg and Levinson (2006). This study utilized six focus groups comprised of 48 family physicians practicing in Canada to find out how physicians handle eHealth information when it is brought to the medical examination. Three themes emerged from the focus groups: (1) perceived reaction of patients, (2) physician burden and (3) physician interpretation and contextualization of information. The physicians who participated in this study perceived the eHealth information to be problematic, causing patient distress, generating patient misinformation, leading to detrimental self-diagnosis and generating an increase in their responsibilities and workload. This additional responsibility was unwelcome and the physicians were generally not prepared to deal with these patients. The study found that effective

initiatives to make physicians aware of the increased use of eHealth information by patients should begin at the healthcare system level. The study recommended that healthcare systems should develop patient management guidelines and incentives for physicians to acknowledge the use of eHealth information to facilitate improvements in both physician/patient communication and patients' health outcomes.

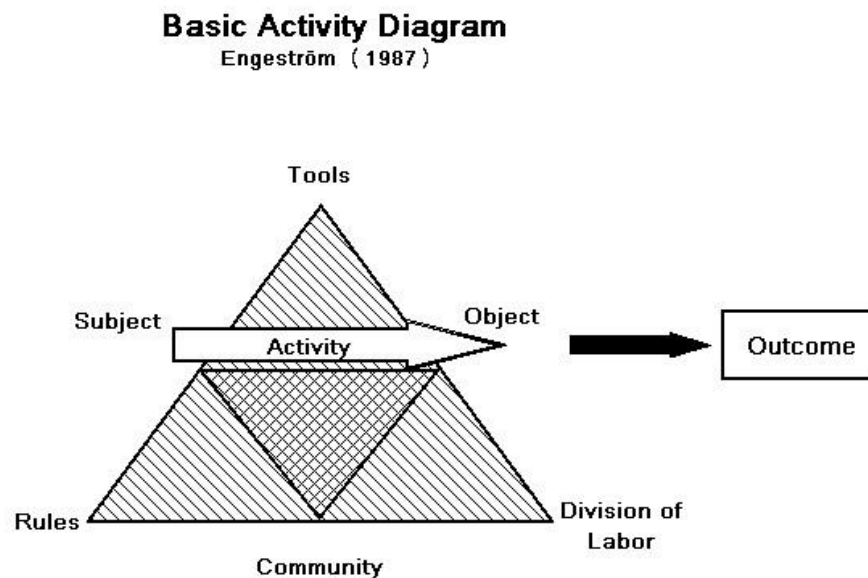
Kim and Kim (2009) surveyed 493 Korean physicians to determine their perception of the effects of eHealth information on the physician/patient relationship. The study found that 89% of the doctors surveyed had patients who discussed health information found online. The survey results indicated that the physicians felt the eHealth information had enhanced their patients' knowledge about their health, but could also be attributed to negative effects such as increasing healthcare costs, causing patients to be overly concerned about their condition or impeding the physician's time efficiency and potentially hindering their examination. The results demonstrated that 43% of the time the eHealth information introduced was irrelevant to the patient's condition and 39% of the time the information was actually incorrect. The perceived effect of eHealth information by the physicians on the physician/patient relationship was neutral. However, more physicians indicated a positive perception of the effect of eHealth information on the quality of care and patients' health outcomes. This study indicated that even though eHealth information is perceived as a double-edged sword in regard to its effect on quality of care, physician/patient relationships and healthcare utilization by the physician respondents, its benefit could be improved by increasing its accuracy, improving physicians' communication skills, educating and increasing physicians' awareness of

eHealth information and reimbursing physicians for the time and effort expended adopting the use of eHealth information and new technology.

A more recent study by Ahluwalia, Murry, Stevenson, Kerr and Burns (2010) utilized semi-structured interviews with a diverse group of general practitioners in the U.K. to determine strategies that the doctors use to handle the situation when eHealth information is brought to a patient examination. The results indicated that the doctors experienced anxiety in response to patients bringing eHealth information found to their examination. This anxiety was experienced primarily as fear of being perceived as ignorant or incompetent, fear of loss of control of the examination and fear of being undervalued or devalued. The physicians developed methods to deal with this anxiety by distancing themselves from their emotional response and using cognitive and behavioral techniques to respond appropriately to their patients. These techniques included buying time during the examination, learning from previous consultations and using the Internet as an ally for directing patients to particular web sites. The study also stressed the importance of the physicians feeling valued by their patients and how the prior physician/patient relationship plays a key role in the physician's ability to handle the anxiety created by the situation. The study concluded that the mechanisms that the doctors utilized may be applied by others to deal with emotions when difficulties arise due to eHealth information being introduced during the examination process. These studies indicated a need for more research to examine when patients are introducing eHealth information during the examination and the effect of patient-introduced eHealth information on physician's productivity.

### ***Engeström's Activity Theory Model***

Activity Theory provides a framework for studying the “when” of patient-introduced eHealth information because it includes the organizational needs of the physician’s medical practice, defines the cultural, cognitive and social aspects of eHealth information in the process and provides a picture of potential problems and bottlenecks created by the patient’s introduction of eHealth information into the physician’s examination workflow. The framework also requires that the activity completion tasks be hierarchical as in the *physician examining patient* activity. This is best illustrated with Engeström’s Activity Theory model below (see Figure 1).



**Figure 1. Engeström's Activity Theory Model**

The concepts of Activity Theory utilized in Engeström’s model (see Figure 1) are subject, object, tools, community, rules and division of labor. Subject is defined as an

agent or group who acts. Object is defined as a person, place or thing to which the activity is focused or directed. Tools may include tangible tools (e.g., hammer) or intangible tools (e.g., knowledge) supporting the activity process. Community is defined as other agents that support the activity. Rules regulate the activity within the community. Division of Labor is defined as relationships and interactions within the community that affect the completion of the activity (Engeström, 1987).

The activity diagram illustrates a three-way interaction between subjects, objects and community with each of these interactions mediated by tools, rules and division of labor. These interactions support the basic “learn by doing” premise of Activity Theory (Engeström, 1987). By modeling the *physician examining patient* activity through defining the subject, object, community, tools, rules, and division of labor of the activity, the contradictions in the process should emerge (Engeström, 2000). Activity modeling, therefore, provides a better understanding of the best fit for eHealth information introduction by the patient during the physician/patient examination and knowledge transfer process.

The research from the literature defines who eHealth seekers are, what they are looking for online, where they are seeking eHealth information, why they are seeking eHealth information and how they are evaluating the health information they find. However, a gap in the literature exists, and further research could indicate what activities, actions and goals best support the physician workflow process when eHealth information is introduced by the patient. By interviewing physicians and modeling their workflow,

this study provides research to better understand “when” patients are introducing eHealth information and its affect on the physician/patient examination and knowledge transfer process.

### **Chapter III. METHODS**

This study examined the family physician/patient examination activity by recruiting ten North Carolina family physicians to participate in an interview. The interviews were audiotaped and then transcribed for evaluation. Analysis methods included workflow modeling using task structure charts and activity diagrams, data calculations, tables and figures for comparison of qualitative and quantitative data obtained from the physicians' interview transcripts.

#### ***Recruitment of Participants***

The population of interest was family physicians licensed by the North Carolina Medical Board in Family Medicine. Interviewing only physicians licensed to practice Family Medicine in North Carolina ensured the validity of the sample population. The sampling strategy, however, also limited the respondents to only family physicians in North Carolina, so the results may not be generalizable to family physicians in other states, or to all family physicians in the United States (Fowler, 2009). The interviews were conducted only with a convenience sample of physicians who volunteered to participate, and therefore, was not a probabilistic sample of the target population.

According to the North Carolina Medical Board web site (NC Medical Board, 2011), 3,522 physicians had an active license to practice Family Medicine in 97 counties in North Carolina. The counties with the highest concentration of licensed Family Medicine physicians are Mecklenberg (248), Wake (241), Guilford (149), Buncombe (144), Forsyth (131), Orange (98) and Pitt (77), for a total of 998 family physicians. These counties also contain most of the state's major hospital systems and medical centers. The initial recruitment list of physician participants was created by choosing every 20<sup>th</sup> family medicine physician licensed in the high concentration counties above, and then contacting them using their professional contact information obtained from the North Carolina Medical Board web site (NC Medical Board, 2011). Additional participants were to be recruited via snowballing from the initial participants (see Appendix B). Privacy and confidentiality were preserved for respondents via coding to mask the participant's identity. All participants provided written informed consent prior to the interview and agreed that the interview could be audiotaped (see Appendix C).

Of 120 North Carolina family physicians initially contacted, 12 responded, for a recruitment response rate of 10%. Of those who responded, one physician replied that he was unavailable to participate in an interview due to time constraints, and one said she was not qualified to participate in the interview because she was no longer seeing patients, resulting in an actual response rate of 8.3%. The small pool of participants can be attributed to the challenges of recruiting practicing physicians who were not familiar with the study or researcher. I initiated contact by leaving a voicemail message, leaving my phone number with a receptionist with a request to return my phone call, or sending



an email message to the physician. Once the physician initiated contact with me, each one was willing to give me their cell phone number, pager number, home phone number or email address to schedule the telephone interview and obtain consent. However there was always a minimum of two weeks between my initial contact and the scheduling of the telephone interview. In addition, none of the physicians were willing to help recruit other physicians via snowballing, most likely due to physicians' reluctance, when asked, to volunteer names or contact information of their peers out of respect for their privacy. Thus, the time involved acquiring both initial physician contact, consent and scheduling the telephone interviews, and the absence of snowballing as a recruitment method, resulted in limiting my participant population to a convenience sample of ten family physicians interviewed.

### ***Interviews***

This research employed the interview method because it allowed data collection for the study with an individual activity as the unit of analysis. Interviews can be used for descriptive, explanatory and exploratory purposes (Fowler, 2009). Interviews provide the researcher with a mechanism for collecting subjective, objective, qualitative and quantitative data with the advantages of greater flexibility in sampling and fewer misunderstood questions. Other data collection methods may be useful for gaining insights into sensitive issues where anonymity of respondents is important, however, interviews were chosen for this study to utilize a method familiar to the physicians. Interviews are also more effective for gathering data by tape recording responses and

analyzing those transcribed responses for complicated issues such as physician/patient communication and clinical workflow processes (Babbie, 2007).

The interview design utilized both closed-ended and open-ended questions (see Appendix A). The interview questions were designed to specifically answer questions to complete the elements of a preliminary activity diagram (see Figure 1). Quantitative data was gathered via questions 4, 5, 21 and 22, which collected data through closed-ended questions, (e.g., How many days a week do you schedule patient appointments? or How many patients do you see each week?). Qualitative data was gathered via questions 1- 3, 6 - 20, 23 and 24, which collected data through a combination of closed-ended and open-ended questions, (e.g., List the steps you follow when interacting with a patient from the time you enter the examination room until you exit the room or What does the phrase “patient health literacy” mean to you?) The reasoning behind the interview questions asked is listed in Table 1.

The interview instrument was pilot tested for reliability and validity, by first recruiting a subsample of three physicians to participate in a pilot to assess the interview instrument (Wildemuth, 2009). The pilot test demonstrated that the most effective method for conducting the interviews was via telephone due to time constraints and scheduling conflicts involved when utilizing a face-to-face interview. The pilot test also resulted in the elimination of the “Does your practice have a web site?” question since that information was readily available and easily accessible to the interviewer. Each

practice web site was therefore visited by the interviewer when that question was eliminated. The telephone interviews were tape recorded and transcribed for evaluation.

### ***Data Analysis***

Evaluation of each interview included quantitative and qualitative analysis methods and modeling of the individual activity of *physician examining patient* for each physician. The analysis included breaking down each physician's examination steps into tasks and subtasks using Hierarchical Task Analysis task structure charts to better understand the interaction of the physician with the patient during the examination (see Appendix E). Activity diagrams were also created for each *physician examining patient* activity in conjunction with task structure charts. Modeling of work activities provided both a big picture of the community activity systems and individual activity systems of each physician while examining patients (see Appendix F). Figure 9 was created to visualize and summarize all *physician examining patient* activity components into one activity diagram.

Data, obtained from the interview transcripts, were used to calculate each physician's patients/hour productivity value (see Appendix D). Productivity values were derived by dividing number of patients seen per week by number of days worked per week divided by 8 hours per day. Tables and figures were created to further analyze physicians' demographics, use of electronic medical records, medical school attended, community, division of labor, productivity, definition of patient health literacy

comparison, medical terminology used, physician recommended web sites and medical practice rules, laws and regulatory agencies.

Table 2 contains physicians' demographics, use of electronic medical records, medical school attended, co-worker communities, division of labor and productivity calculations. Figures 2, 10 and 11 were created from data contained in Table 2. Table 3 contains an analysis of the physicians' suggested web sites and Figure 5 provides a frequency of those recommendations. Table 4 contains the physicians' definitions of patient health literacy and Figure 7 compares their definitions to the Centers for Disease Control and Prevention's health literacy definition.

Additional figures were created from information obtained from analysis of the interview transcripts. Those figures analyze the frequency of patient-introduced eHealth information (see Figure 3), physician recommended health information formats (see Figure 4), use of email for physician/patient communication (see Figure 6), and the object of the *physician examining patient* activity (see Figure 8).

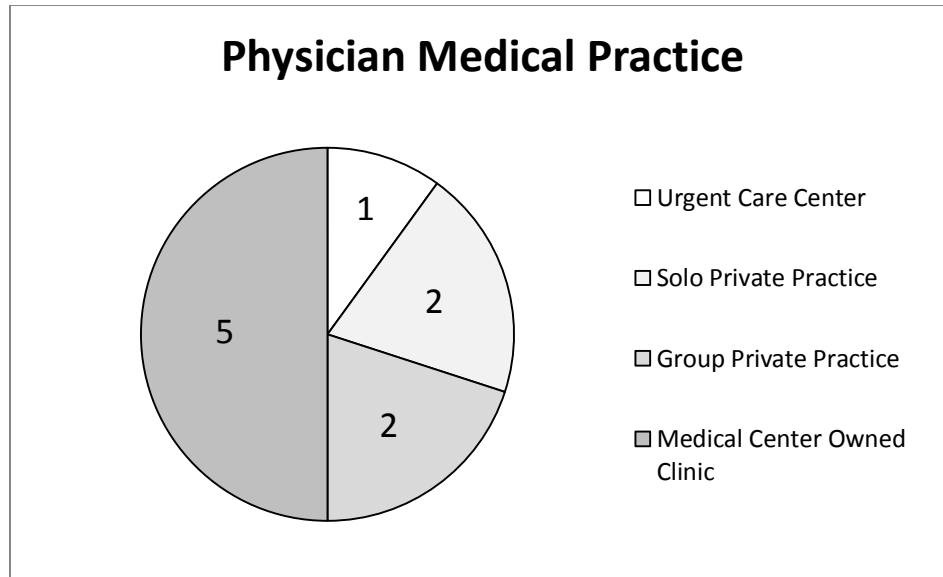
## **Chapter IV. Results**

The study results include the demographic characteristics of the family physician participants, physician/patient communication and eHealth information and a comparison of physicians' definitions of patient health literacy with the Centers for Disease Control and Prevention's definition of health literacy. The results also include components of the physician examining patient activity diagrams including the object, tools, rules, community, division of labor and outcomes, and comparisons of physician productivity values.

### ***Characteristics of Family Physician Participants***

Of the ten North Carolina family physicians interviewed, six were Caucasian males, three were Caucasian females and one was an African-American female. Their ages ranged from 34 to 60 years of age with a median age of 48.5 years. The physicians had been practicing medicine from five to 34 years. All had graduated from medical school in the United States with four from the University of North Carolina at Chapel Hill, and one each from Duke University, East Carolina University, Temple University, University of Cincinnati, University of Colorado and University of Maryland (see Table 2).

Four of the physicians were in family practice clinics owned by medical centers, one was in a community clinic owned by a medical center, four were in private practice (two in solo private practice and two in group private practice), and one was in a privately owned urgent care center (see Figure 2).



**Figure 2. Physician Medical Practice Type**

Four of the physicians described their practice of medicine in traditional terms such as private practice or urgent care center.

Family Physician Three: *It is a privately owned urgent care center.*

Family Physician Nine: *Private practice, but I am in the process of selling to [name of local hospital] because new*

*physicians that want to come out of school and run their own business are just not out there anymore which just amazes me. The model of private practice is over.*

Others defined their practice by describing those they worked with, specific populations served or providing detailed information about their practice.

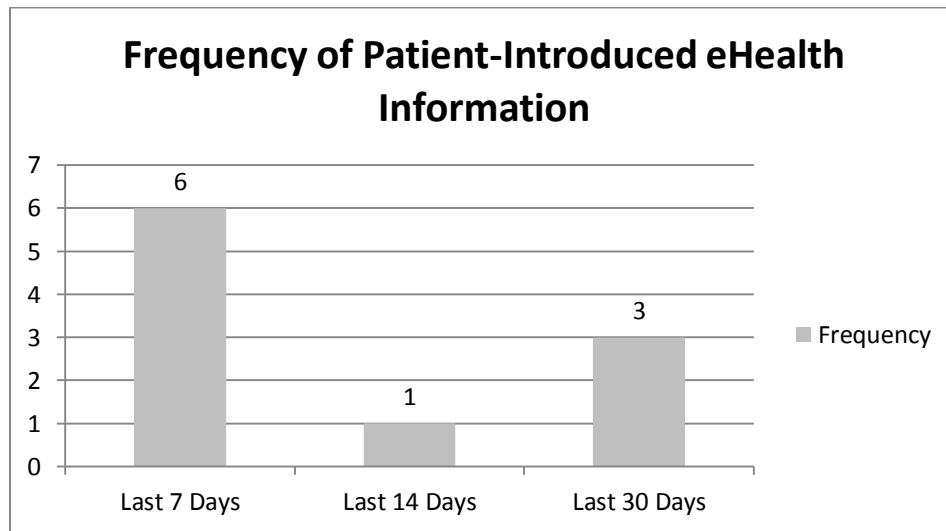
*Family Physician One: ...is a very large physician group that is all a multi-specialty group. We are all employees and faculty at the medical school.*

*Family Physician Six: ...I have a fair amount of older patients since I am a family physician and a geriatrician and I have a fair amount of older patients with chronic conditions...*

*Family Physician Two: Part private practice and part teaching faculty, so I have a combination of family medicine and sports medicine, and I work for a private group, and also on the teaching faculty at the hospital.*

### ***Physician/Patient Communication and eHealth Information***

The introduction of eHealth information by the patient during the examination activity was experienced by six physicians within the last seven days, one physician within the last 14 days and three physicians within the last 30 days. Figure 3 below demonstrates the frequency of patient-introduced eHealth information.



**Figure 3. Frequency of Patient-Introduced eHealth Information**

Some physicians felt that the introduction of eHealth information by the patient was disruptive and time-consuming.

*Family Physician One: In my case it is actually more often than not it is more disruptive and I kind of have to take an unnecessary tangent to review what they brought in and*



*more often than not I have to refute what their neighbor thinks is going on or someone else thinks is going on and explain why that is not the correct diagnosis. In many cases it makes the visit longer and more cumbersome.*

Other physicians just seemed to accept patient-introduced eHealth information as part of their normal routine and fit it into their examination workflow.

*Family Physician Five: ...they all come across things on the internet. A lot of times they will like put in a symptom online and then they will come up with a gazillion kind of differentials that it could be, so sometimes they get the target and sometimes it is so way off...I will kind of push them toward what we see most prominently as far as what their symptom is and then let them know why it is probably unlikely that it is something in the “zebra” category.*

Evaluation of the task structure charts, using Hierarchical Task Analysis techniques, demonstrated that all physicians reported that they performed the same set of six subtasks during the patient examination. The subtasks performed by all physicians were (1) Enters examination room, (2) Communicates with patient, (3) References medical record, (4) Examines patient, (5) Communicates with patient and (6) Leaves examination room. (see Appendix E) The introduction of eHealth information by the patient occurred during one of the “Communicates with patient” subtasks, either at the

beginning or the end of the examination depending upon when it was introduced by the patient.

Family Physician One: *...I will acknowledge it [patient-introduced eHealth information] before I begin, I will sort of glance at it and sort of set it aside until I evaluate them and make a decision or have an idea of what I think is going on and then I will look at it more closely to see whether it coincides or whether it is different. It is generally in the discussion basically where we are reviewing findings or lab results and we will incorporate that information they brought into the equation. Sometimes it may be very useful, such as great information, in a lot of cases they bring in information that is not as useful or pertinent and we discuss that.*

Family Physician Two: *I think usually when people bring things in, they have got that on the forefront of their mind so I would just try to address those questions or kind of any questions towards the beginning of the exam. So I try to answer questions like any questions or key questions they come in with or any internet type questions at the beginning.*

Family Physician Five: *Usually it comes at the beginning when they are kind of talking, you know about what they are coming in with, and we kind of go over what they printed out or what they found and then I say let me do your exam first and what not, but this is what I am thinking as far as what they have printed out.*

Family Physician Ten: *Usually toward the end of the visit, that is usually when they pull out their stuff from the internet toward the end of the visit.*

The physicians who were utilizing electronic medical records systems, that included patient educational material often, printed out health information for their patients.

Family Physician Two: *It is all very problem specific so I do a lot of sports medicine and orthopedics so there are hundreds of handouts for different conditions and rehab programs and that comes from a variety of settings from things that I have found from large teaching programs in the country. For basic conditions the handouts in our EMR are pretty good for a few things like diabetes, high blood pressure, cholesterol things like that. I will point them to*

*specific web sites and they have many things that are on there that they can read....*

*Family Physician Five: ...So it's usually I like have my certain web sites that I go to so I will show the patients where to go if they have access to a computer or I will print off some stuff...I usually print it out, like as a Word document or I will write it down for them in addition to the Word document...I have handouts that you can get to electronically on our EMR and I will print them out.*

*Family Physician Seven: ...For me I will print out something from familydoctor.org. For example, I will print out something on shingles and give them a printout.*

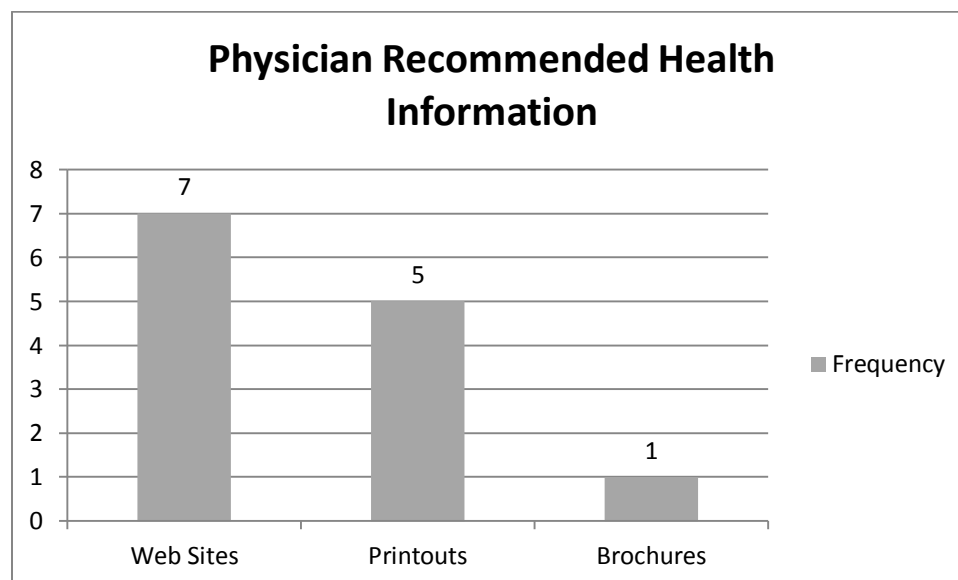
*Family Physician Ten: ...we have a lot of stuff that we print off the internet but it is hard copy so we do not refer them to internet sites. We give them paper, no internet sites.*

Other physicians referred their patients to web sites or provided brochures with links to web sites. One physician recommended web sites when they needed to counteract bad information their patients had found online.

Family Physician One: *...if they have brought in some information from the internet that may not be accurate that's when I will bring up to them that here's a good site that you can look at.*

Family Physician Eight: *In every exam room there is "quit smoking", fitness, weight loss, hypertension or diabetes pamphlets, brochures or handouts. We give them these handouts that also have urls for websites printed on them.*

Figure 4 below demonstrates the various types of health information provided to patients by the physicians.



**Figure 4. Physician Recommended Health Information**

Some physicians suggested their patients visit specific web sites for additional health information. Some physicians had developed criteria used to select web sites they described as known, trusted, accurate, reliable and high quality or they knew the url. One physician recommended that their patients not go to as he described “junk” sites.

Family Physician One: *...I think most of us have a few sites like Medscape for example or WebMD that are considered known and trusted and have more worthy information and we will work more to get people to those sites as opposed to just whatever comes up on Google.*

Family Physician Two: *...so for instance, the American Diabetes Association has dozens and dozens of high quality information about diabetes and I always caution patients that you should not go and just Google certain disease conditions, that many times that information that they just randomly find will not be necessarily good advice or accurate. I try to point them to accurate or reliable information, often times I tell them that if they want to go and look for things on their own that WebMD is a good resource.*

Family Physician Seven: ...*I will print out something from familydoctor.org...But today I was able to refer a patient to a web site for a fitness group in town because I had seen it advertised and knew the url.*

Family Physician Nine: ...*I have got links to all that on our web site, some high quality ones... We just send them to our web site and I tell them not to go to the “junk” sites...*

The physicians recommended thirteen specific web sites to their patients. Figure 5 shows the actual eHealth web sites recommended to patients by the physicians, and of those recommended sites, those sites containing advertisements or commercial sites.

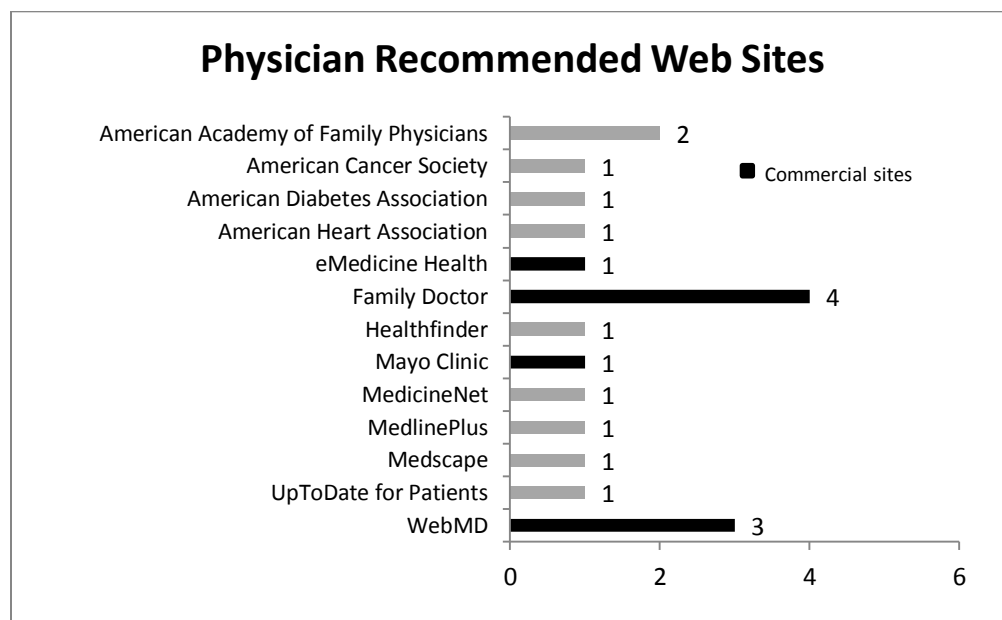


Figure 5. Physician Recommended Web Sites

The physicians expressed both legitimate concerns and practical reasons for not communicating with patients via email. Physicians were concerned about HIPAA violations when communicating via unencrypted servers and personal privacy issues.

Family Physician Two: *My understanding is that it is actually, and I just found this out, it is not actually a HIPAA encoded, unless you have very, very strong server encryption, it is not a HIPAA protected communication tool so you would actually be violating HIPAA by emailing someone to a Gmail or Yahoo account. You have to set up certain boundaries in terms of how available you are for your patients and I don't give out my personal phone number or my email for any patient. Just for me, that is the standard that I use.*

Family Physician Three, who worked in the urgent care center, had no relationship with her patients, and therefore, had no reason to communicate via email with them.

Family Physician Three: *Because, I guess, primarily in the urgent care setting we have no relationship with the patient. There would really be no reason to communicate with the patient. If they have a problem with what*



*happened or how they were treated they call back and there is no formal communication directly between doctor and the patient via email in my office.*

Family Physicians Six and Eight encouraged their patients to communicate via their patient portals.

*Family Physician Six: I have a few of them that I do but I try to encourage them to use our portal because it is secure and you can connect it to our EMR and it works better in terms of flow. I use email a lot for lots of things but I encourage them [patients] to use our EMR.*

*Family Physician Eight: ...Yes, a lot of time when we get lab results, if the patient has decided to participate in our patient portal, I send them an email with a link. Then they go there and see their results. It happens once in a while that a patient will email me but they have told us that the level of encryption for our email is not high enough. Also I do not check my email as often as a patient would like, so I may not see it for several days...*

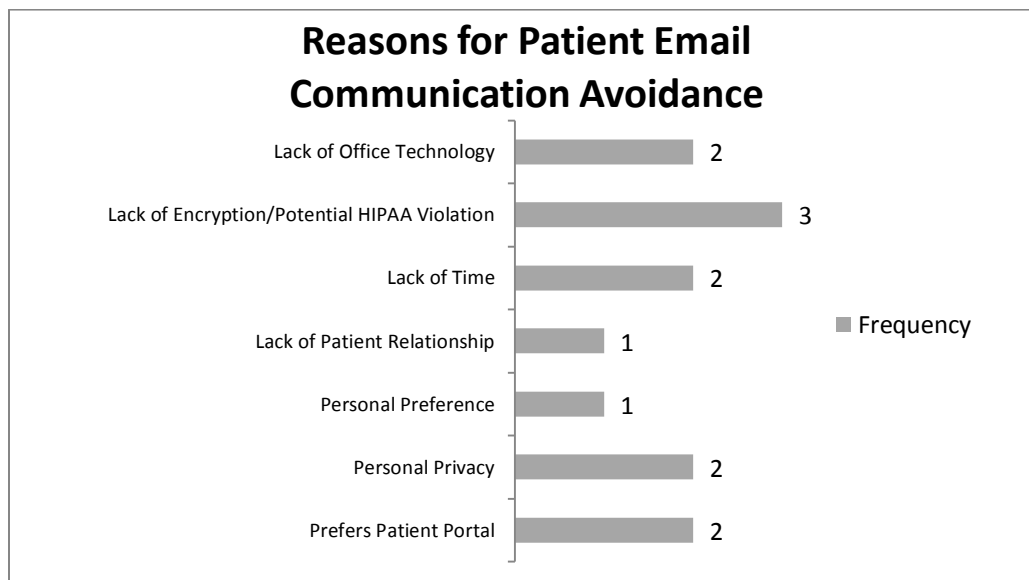
Family Physician Nine expressed a desire to communicate with his patients via email but lacked the office technology to do so.

Family Physician Nine: *I do not because of the complexity of it right now. The web site that we have has the capability of enabling email systems but right now we do not have it turned on but it would interact with our electronic medical records. There are so many steps that you have to go through to make that happen. It would be nice for me to be able to send an email to a client and it would be real beneficial and that is the next step that we hope to enable.*

Family Physician Five communicated with her patients via email but stated it was very time-consuming because they sent them at all hours of the day and she spent hours answering patient emails.

Family Physician Five: *Yes, but it can be very time consuming...I think it is really nice for the patient because they can get answers from me specifically versus having to go through a nurse, but it is very time consuming because sometimes patients will send them at all hours. Sometimes I take hours answering everybody's email.*

The reason categories for not communicating via email with patients included: (1) lack of office technology, (2) lack of encryption resulting in potential HIPAA violations, (3) lack of time, (4) lack of patient relationship, (5) personal preference, (6) personal privacy and (7) preference for using their patient portal for communicating with patients (see Figure 6).



**Figure 6. Reasons for Patient Email Communication Avoidance**

### ***Physicians' Definitions of Patient Health Literacy Comparisons***

Health Literacy is defined by the Centers for Disease Control and Prevention (CDC), as the capacity to obtain, process, and understand basic health information and services to make appropriate health decisions (Centers for Disease Control and Prevention, 2011). The chart below compares the components of the physicians' definitions of patient health literacy to the components of the CDC's definition of health literacy (see Table 4). As shown in Figure 7, two components of the CDC's definition do

not appear in the physicians' definitions. Those components were the patient's capacity to obtain basic health information and the patient's capacity to obtain basic health services.

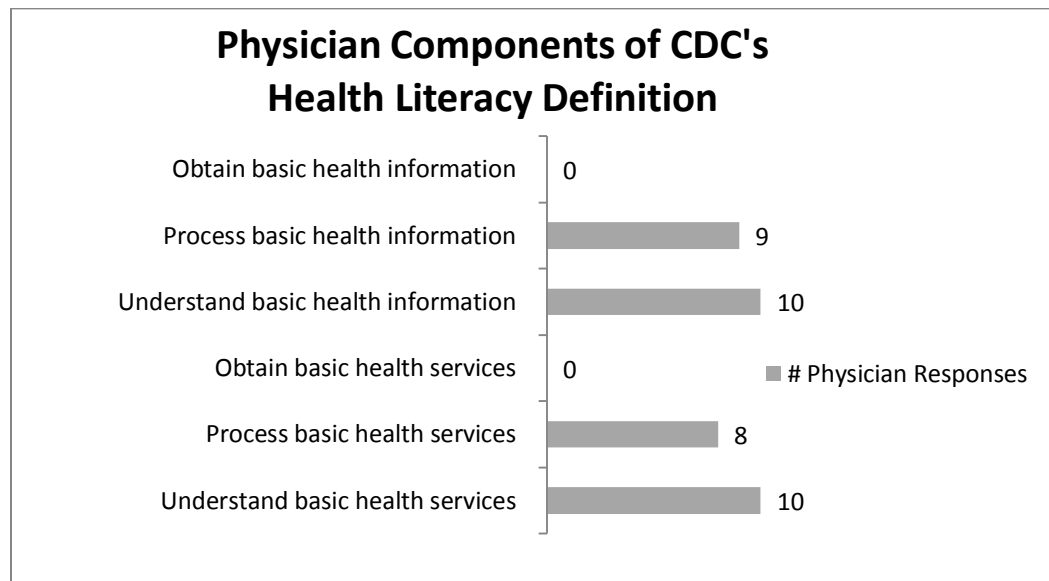


Figure 7. Physician Components of CDC's Health Literacy Definition

### ***Components of Physician Examining Patient Activity***

Activity Theory was used as the framework for modeling the *physician examining patient* activity because activity diagrams illustrate the organizational needs of the physician's medical practice, define the cultural, cognitive and social aspects of eHealth information in the process, and provide a picture of potential problems and bottlenecks created by the patient's introduction of eHealth information into the physician's examination workflow.

The components of an activity diagram include the subject, object, tools, community, division of labor, rules and outcome. The subject of each activity in this study was the family physician and was defined as the person who acts (Engeström, 1987).

The object of the examination activity is defined as a person, place or thing to which the activity is focused or directed (Engeström, 1987). The physician defined object categories were patient/patient's health, diagnosis of the problem and listening to the patient (see Figure 8).

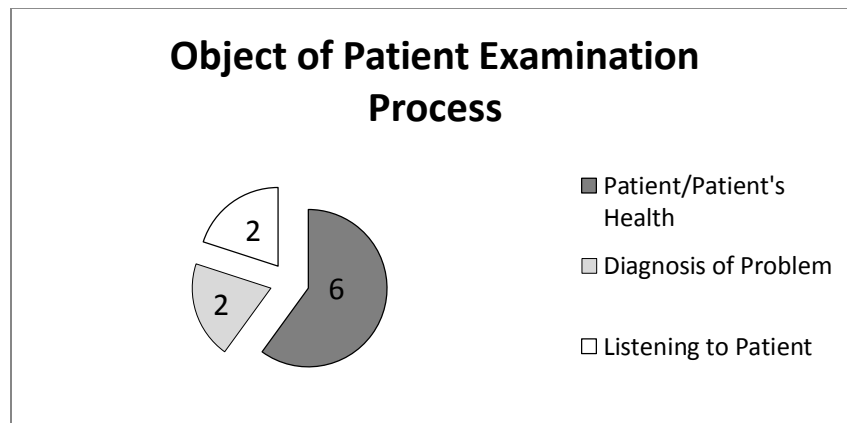


Figure 8. Object of Patient Examination Process

The physician responses below contain examples of the object categories: (1) patient/patient's health, (2) diagnosis of the problem and (3) listening to the patient.

Family Physician One: *...There is part of an exam that you are doing that is focused on the presenting problem and*

*may be even for diagnostics. Part of the exam may be more therapeutic than that. If someone comes in and makes a real effort even if there is not a whole lot that I need to examine, I will still put my hands on them and listen to their heart and listen to their lungs...*

*Family Physician Six: ...I am sort of confirming things, it is a wound or sometimes it is just a brief cardiopulmonary event, so I may be confirming positive findings or negative findings. The exam may be brief but sometimes I may be educating patients about chronic problems. I spend more time on the diagnostic dilemma if we do not have a focused final diagnosis so I may be looking for clues so it varies from patient to patient.*

*Family Physician Seven: Listening to the patient and addressing their needs.*

Tools are used to mediate an activity and include both tangible and intangible tools which support the activity of examining the patient (Engeström, 1987). Tools utilized by the physicians during the examination process included the physician's medical knowledge, the patient's knowledge, patient-introduced eHealth information, physician suggested eHealth information, standard medical instruments, electronic

medical records, non-electronic medical records, vital statistics, lab and/or diagnostic test results, prescription and/or medication information, computers and smartphone. Patient-introduced eHealth information emerged here as an intangible tool used by the physicians during the examination process.

Nine of the physicians had implemented electronic medical records systems in their practice and one physician was using a smartphone to access prescription information. Computer technology was used by nine of the physicians in the examination room. Examples of using a smartphone and electronic medical records in the examination room are in the physicians' responses below.

Family Physician One: *I will view the electronic medical records and get any prescriptions in the computer...I generally don't type while I am listening to them...I use the computer to access their record or recent lab results, more often than not I am using my iPhone as a medical resource looking up prescriptions for example.*

Family Physician Two: *...my practice is fully on the EMR, so I probably 90% of the time bring a laptop into the room with me. I can type really fast so I just put the laptop in my lap and try to type what the patient is saying...if they come in for a physical or if they've got, you know, diabetes or*

*high blood pressure or something like that then I would, I usually like to show them the [computer] screen to show them what their numbers or what their labs look like.*

*Family Physician Six: ...We have electronic medical records and that helps to focus on all that. I bring in this type of cart and it is like my desk...I sit next to the patient with the cart next to me. My patients usually like that and I usually have the chart opened up on their record when I come into the room so I don't have to fumble or do anything to put it up on the screen and I show it to them ...sometimes I use the Internet in addition to the EMR...*

*Family Physician Nine: ...I have a tablet PC with a pen device that you can use as a mouse...I am entering data into the computer as we talk, either I am typing it in for different things or it's kinda got this auto fill so if their exam is normal I can just tap and the heart and lung information just fills in automatically for normal stuff...At a lot of times it is very minimal typing at all. Other times if I have got to enter more data...Then I have voice recognition software so I will dictate that. Most of the time I do all of this stuff and interaction with the computer into*



*the chart while the patient is right there in front of me so I am completely through with the record when I stand up and walk out of the room.*

Most physicians with access to electronic medical records systems in their practices perceived them simply as another “tool” in the physician’s toolbox. Electronic medical records systems were used for patient file storage and as communication tools within clinical practices and between clinical practices. However integration with other systems was mentioned frequently as a barrier to full implementation of electronic medical records systems and its use as a communication tool with patients and other physicians.

*Family Physician Three: Yes... It was introduced to me and I assume it was to hopefully improve quality and efficiency which in my opinion it does not actually do. It does though help having the patient’s history on file and past treatment. Initially I think it was set up to avoid errors, but sometimes that is not the case at all.*

*Family Physician Eight: ...right now there are two systems working in parallel...we tend to refer to [name of employer] anyway because it is easy to get to the information instead of waiting for something in the*

*mail...They are developing our über system to replace everything that we are doing now.*

*Family Physician Nine: It really enhances your ability to practice medicine cause, I can for example...just click on...the patient's glucose and it will graph it. Since we have been using electronic medical records since 2004 and it will graph it out since 2004. It is a wonderful tool, you are practicing better medicine, health maintenance. Medicine has gotten so complicated that you can't remember it all so if I prescribe a drug the computer keeps track of all the drug interactions. Ultimately it speeds you up even though originally it slows you down. I would not want to go back to paper and it is cheaper, and we have all of this documentation so when we get audited you can just give them the information. They come back every year to audit and we don't get written up for it. It is a CYA tool.*

*Family Physician Ten: We are able to communicate throughout the entire clinic and we are now able to communicate with the hospital. It just makes sense and it is better.*

Community is defined as the office staff that supports the activity of examining the patient (Engeström, 1987). Community in the physicians' practices included the following titles: Administrative Staff, Business Office Staff, Certified Nurse's Aides, Front Desk Supervisor, Front Office Personnel, Practice Managers, Clinical Care Coordinators, Instructional Assistants, Laboratory Technicians, Licensed Practical Nurses, Medical Assistants, Medical Residents, Nurse Practitioners, Nursing Supervisor, Office Managers, Phlebotomists, Physician Assistants, Radiology Technicians, Receptionists, Referral Clerks, Registered Nurses and Schedulers. The size of the physician's community ranged from three to 30 employees. Size of community was generally dependent upon practice type, for example, the physicians who worked in major medical center clinics had larger communities compared to the private practices and the urgent care center. Community for each physician is listed in Table 2 and a glossary of health care terms and definitions, (including community members' titles), is provided for reference in Table 5.

Division of labor is defined as relationships and interactions within the community that affect the completion of the activity of examining the patient (Engeström, 1987). Division of labor was obtained by analyzing the physicians' answers to the interview question: How do these other employees support the activity of examining patients? to determine which employees directly supported the *physician examining patient* activity. The results of the analysis showed division of labor was comprised of Registered Nurses, Licensed Practical Nurses, Nurse's Aides and Medical Assistants directly supporting the activity of examining patients. Division of labor for

each physician is listed in Table 2 and a glossary of health care terms and definitions, (including division of labor members' titles), is provided for reference in Table 5.

Rules regulate the activity within the community (Engeström, 1987). Common rules and laws that govern the practice of medicine in North Carolina, in addition to local, state and federal laws, include the Chaperone Rule, Clinical Laboratory Improvement Amendments of 1988, Health Information Technology for Economic and Clinical Health Act, Health Insurance Portability and Accountability Act of 1996 Privacy and Security Rules, Medical Malpractice Liability and the Patient Protection and Affordable Care Act of 2010. Regulatory agencies that govern medical practices in addition to the North Carolina Medical Board are the Centers for Disease Control and Prevention, U. S. Department of Health & Human Services, Drug Enforcement Administration, Occupational Safety & Health Administration and Recovery Audit Contractors. A description of these rules, laws and regulatory agencies are provided in Table 6.

There were no practice specific policies or procedures that the family physicians were required to follow during the examination activity mentioned in the interview responses. Many of the physicians expressed a sense of autonomy with fewer regulations and guidelines to follow in the organization of their work in both medical center owned clinics and private practices. However all physicians seemed to be keenly aware of the risk management implications for not following rules, laws and regulations to minimize liability, litigation and malpractice claims for their clinical practices such as the Chaperone Rule and HIPAA. Family Physicians Two and Nine also mentioned other

regulatory agencies such as OSHA, DEA and CLIA or RAC auditors and private medical insurance company inspectors (see Table 6).

Family Physician One: *...The nice thing about being in an academic practice and our academic practice is included is that there are fewer regulations and fewer stipulations on how you do things as long as you are following good medical practice, so we are primarily covered by state and federal laws and not so much by current policy.*

Family Physician Two: *I think we just follow HIPAA and general guidelines. You follow general doctor/patient relationship and privacy rules. In private practice you have less formal guidelines to follow than you would have to follow like you would have to do for UNC [Healthcare]. We have OSHA standards and things that we have to do as a health care facility but I am not sure if any of that directly impacts to how you would deal with patients. Of course you would follow DEA laws and things like that.*

Family Physician Four: *I really don't know of any extra rules not covered, other than the standard policy of chaperoning, then that is the biggest rule we have ...and*

*everybody has that or should have it. I don't know whether that is local or state law or kind of general medical board practice.*

*Family Physician Five: None [other than local, state, HIPAA and other federal laws] that I am aware of. If there is then I am not following it. I don't know of any other policies or anything.*

*Family Physician Six: We have institutional guidelines that are standards and are just being developed. They are set up by the [name of employer] admissions group. They monitor getting back to patients for calls that are outpatient clinical guidelines, scheduling appointments, like response time and routine appointments for our goals.*

*Family Physician Nine: There is of course OSHA, CLIA, Clinical Labs Information Act, CLIAC, they all regulate our labs to make sure we are following good laboratory procedures. They come in once a year and we have to do that to do billing if we are doing a urinalysis or glucose test. Then the local fire marshal comes in and checks our fire extinguishers. And we get inspectors from Blue Cross,*

*CIGNA, the different payers all come in and inspect, and they are really looking for fraud...There is RAC and you really dread it if they are coming in because they are paid if they find any fraud...*

*Family Physician Ten: Not that I am aware of other than recommendations from your malpractice carriers regarding chaperones.*

Outcome in an activity diagram is defined as the product of the examination activity (Engeström, 1987). The physician defined outcomes were based upon the main result or outcome they hoped to have achieved when they exited the patient examination room.

*Family Physician One: Literally resolution of, or decrease the patient's concerns, or resolution of whatever their problem was that they presented with. Sometimes that may not be a complete diagnosis but it may just be an acknowledgement of the symptoms that they have and an agreement to evaluate them. Literally the goal ends up being resolution of as much as you can of what their presenting concern was.*

Family Physician Six: *Often it is just addressing the agenda and the patient's questions or patient's expectations...It is a balancing issue for meeting their expectations for that particular meeting along with their chronic issues...*

Family Physician Ten: *To come up with a diagnosis of what is going on and to have a diagnosis and treatment set up for the patient about what is going on. Or if it is a problem resulting from a routine visit, to make adjustments in medication and make sure that they are all up to date on their routine health maintenance and get that all in line.*

The intended outcomes the physicians hoped to have achieved when they left the examination room are combined in the activity diagram in Figure 9 below. Activity diagrams provided a visual representation to better identify the eHealth information niche in the *physician examining patient* activity and to better understand the interactions that occurred during the activity. Figure 9 also summarizes all the subject, objects, tools, community, division of labor and rules for the ten *physician examining patient* activities. In addition, a detailed activity diagram containing the subject, object, tools, community, division of labor, rules and outcomes for each individual *physician examining patient* activity is provided in Appendix F for additional reference.



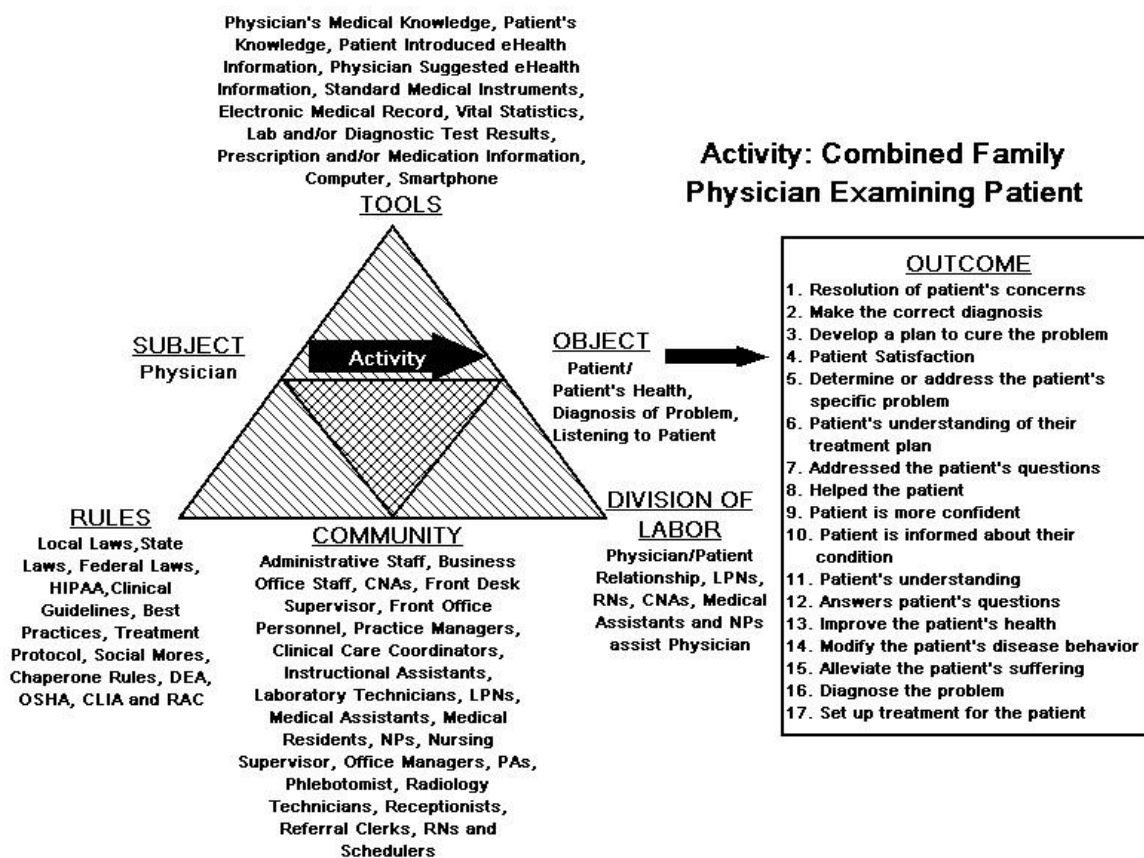
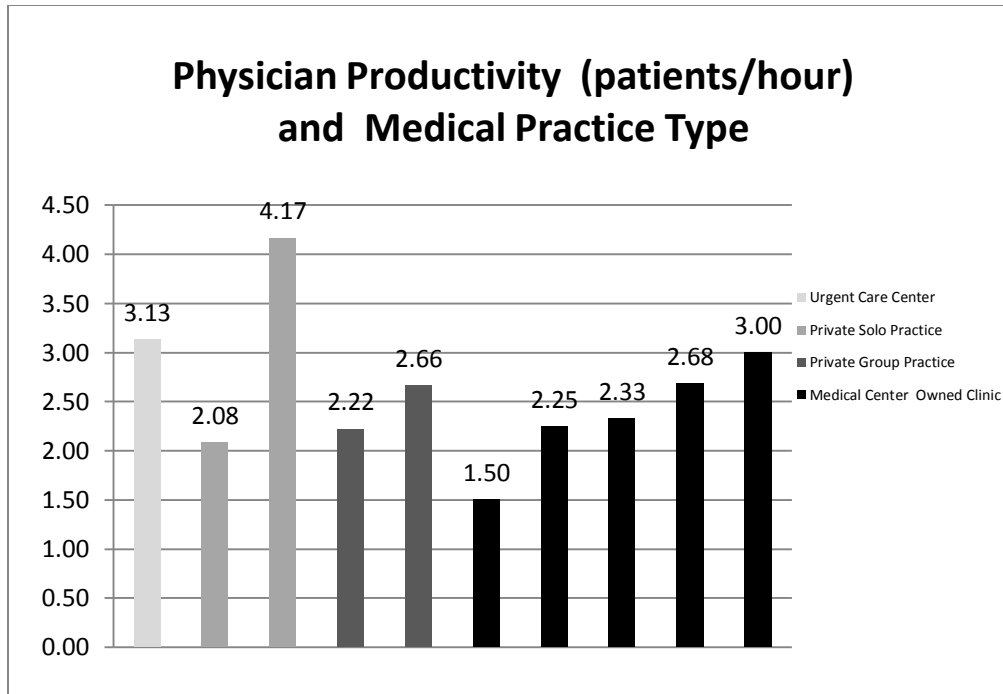


Figure 9. Combined Family Physician Examining Patient Activity Diagram

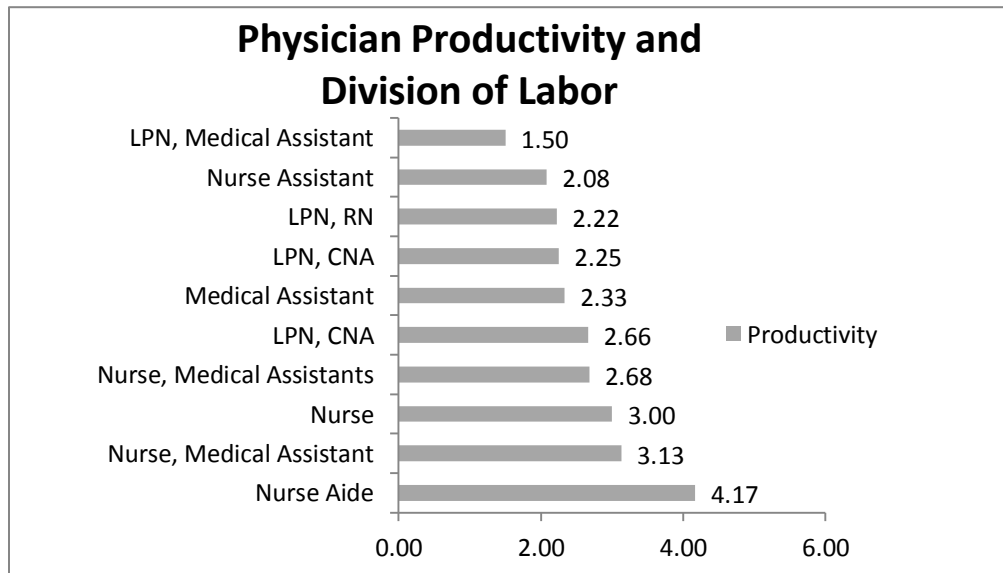
### *Physician Productivity Comparisons*

Physician productivity was calculated by dividing number of patients seen per week by number of days worked per week divided by 8 hours per day. All of the data for productivity calculations was self-reported by physicians and the eight hour workday scale was assumed by the interviewer. The physicians saw patients an average of 3.65 days per week, on an eight hour workday scale, and examined an average of 76.8 patients per week or 21.04 patients per day. Figure 10 below compares physician productivity with physician practice type.



**Figure 10. Physician Productivity and Medical Practice Type**

Figure 11 below provides a comparison of physician productivity with division of labor, or the support staff directly involved in the *physician examining patient* activity.



**Figure 11. Physician Productivity and Division of Labor**

Figure 10 and Figure 11 indicate that neither type of practice nor the number of employees directly supporting the *physician examining patient* activity influence productivity values. However, further evaluation of those physicians with both higher and lower productivity values provided insight into factors that may influence those values.

Family Physician Nine, with the highest productivity value, works in a solo private practice where patient appointments are scheduled three at one time, and Nurse Aides assist in the examination room. This physician utilizes a tablet PC in the examining room and inputs patient data into the electronic medical record during the examination. He also uses voice recognition software for dictation. This physician has also linked suggested web sites for his patients to his practice web site, and either he or his Nurse Aides recommend those web sites to patients.

Family Physician Nine: *...if I need something, sometimes I will step out of the room and go to the next room ...so I can have two of those assistants working on patients while I am seeing a patient in the third room ...I am completely through with the record when I stand up and walk out of the room.*

Family Physician Three had the second highest productivity value. She works in a privately owned urgent care center with a Nurse and a Medical Assistant assisting her in the examination room. Urgent care center facilities are designed for “episodic” primary

care services to optimize efficiency and maximize patient volume (Weinick, Bristol and DesRoches, 2009). The work organization in the urgent care setting, therefore, may have enhanced her productivity value.

Family Physician Three: *The nurse, well, the front desk people check them in and most of the time, list a very brief synopsis of what their complaint is, like most of the time we find when the patient comes in they say I have a sinus infection and they think they have already given us the diagnosis. Then the nurses call the patient in, they open up their office visit, check their blood pressure, temperature, weight if it applies, blood pressure, respiratory, oxygen saturation if that applies and they actually do some of the history gathering and find out what their symptoms are and then they put them in the room, and in our office they put the chart in the rack and we pick up the chart from here in the rack. And let's see, I guess, what else do they do to support? They will administer shots, if they need an injection like a tetanus shot or whatever, for sutures they assist in getting trays together with our suture supplies, the x-ray techs when we put in an order in the computer for an x-ray, they go and get the patients out of the room, get the x-rays and bring them back to the room and the nurses at*

*discharge time the instructions are printed out and the nurses they give the patients their prescriptions and they read the instructions and then they will check them out. Sometimes it depends on how busy they are and how long it takes but most of the time they will assist in checking the patients out.*

Family Physician One had the third highest productivity value and worked directly with a Nurse in the examining room. His community contained not only Nurses, but Medical Office Assistants, Instructing Assistants, Administrative Clerks and Medical Residents. The facility where this physician worked may have directly influenced his higher productivity value since according to its web site description, “*Our center has 58 exam rooms, with areas for X-rays and minor procedures.*” Fifty eight exam rooms would accommodate a higher patient volume capacity by allowing the practice to schedule 58 appointments at one time. Family Physician One was also the only physician who mentioned using a smartphone in the examination room, in addition to his use of electronic medical records and a laptop.

*Family Physician One: ... Typically then I do an examination, and then review what I found and what findings we have and where we need to go from there. Typically then I will view the electronic medical records and get any prescriptions in the computer. We will wrap*

*things up and then head back out to the checkout counter  
where our printer is so I can get prescriptions and lab slips  
from there. Then make a follow up appointment....more  
often than not I am using my iPhone as a medical resource  
looking up prescriptions for example.*

These results indicate that higher physician productivity values are influenced by multiple factors. These factors include: efficient utilization of support staff, organization of workflow, practice business model and use of technology such as electronic medical records, computers and smartphones in the examination room.

Compared to the physicians with higher productivity values, the physicians with lower productivity values had other factors that adversely influenced their productivity values. Family Physician Six, with the lowest productivity value, works in a medical center owned clinic where a Medical Assistant and a Licensed Practical Nurse assist in the examination room. This physician utilizes electronic medical records and a computer in the examination room but he is currently using two electronic medical records systems that are not integrated. This physician also mentioned that he is a practicing geriatrician, so his patients are most likely over 65 with chronic health conditions that require more time to examine, diagnose and treat. In addition, he stated that he had only been in that practice for about two years and was in the process of building the practice resulting in patient output being below capacity. Therefore, his productivity may be adversely influenced by the use of two nonintegrated electronic medical records systems while

trying to build the practice to full capacity along with the extra time needed to care for his elderly patients.

*Family Physician Six: ...We are changing from the system that we have had for about twelve years now to the [name of EMR vendor] system. They are not all integrated as much as we like so we are switching to a new system next year. Right now they are partially integrated but not as much as we would like... ..I have a fair amount of older patients since I am a family physician and a geriatrician and I have a fair amount of older patients with chronic conditions...We have only been in that practice for about two years and we are building that practice, probably my max is twelve when things are fully operating, right now it is averaging about ten....*

Family Physician Four, with the second lowest productivity, works in a solo private practice with a Nurse Assistant assisting him in the examination room. Family Physician Four has not invested in an electronic medical records system. His productivity value may be adversely influenced by his lack of office technology and his use of paper forms to document his patients' medical records.

Family Physician Four: *...I have not invested in electronic medical records... I record it on a scrap paper, scrap is not the right word, it is sort of notation paper and it is dictated later...*

These results indicate that lower physician productivity values are influenced by lack of office technology, inefficient use of electronic medical records systems, low patient output due to practice not being at full capacity and characteristics of patient populations served creating inefficiencies in workflow.



## **Chapter V. DISCUSSION OF RESULTS**

### ***Analysis of Results and Discussion***

This study was conducted to define the eHealth information niche in the physician/patient examination activity and knowledge transfer process. An analysis of the results data obtained from the physicians' interview transcripts, task structure charts and evaluation of the activity diagrams modeled from the interview data, revealed that all physicians experienced patient introduction of eHealth information during the previous 30 days. The findings indicate that eHealth information has an established niche within the physician/patient examination process (see Figure 3).

There were no indications from the results of this study that these family physicians were "unprepared" to deal with the eHealth information introduction, nor that they experienced anxiety when it was introduced by the patient as in previous studies (Ahluwalia et al., 2010). This may be attributed to the family physician/patient relationship being a longitudinal relationship which better enables management of the situation when the introduction of eHealth information occurs. The exception was Family Physician Three who was employed by an urgent care center and self-reported that she had no relationship with her patients. However, many of the physicians perceived eHealth

information as disruptive, generating patient misinformation and increasing their workload as found in other studies (Kim and Kim, 2009; Ahmad et al., 2006).

Nine of the ten physicians suggested health information to their patients by providing printouts and brochures, or recommending web sites (see Figure 4). In addition eight of the physicians had learned to use the Internet as their ally by recommending online resources to their patients. This was a suggested strategy from previous studies (Ball and Lillis, 2000; Kim and Kim, 2009). Of the thirteen physician suggested web sites, four were commercial web sites that contained advertisements for various products including pharmaceuticals and prescription drugs. This indicates that those physicians do not consider bias or conflict of interest to be criteria for exclusion when suggesting eHealth resources to patients or determining the “quality” of the resource as suggested in earlier studies (Brann and Anderson, 2002). Physicians may not be aware that their patients consider bias, especially from pharmaceutical advertising (Fox and Rainie, 2002; Elkin, 2008), when determining the reliability and trustworthiness of eHealth information (see Figure 5).

Since health literacy is an emerging clinical concept in health communication, a question was included in the interview asking physicians to define the term “patient health literacy.” The physicians were able to partially define it compared to the Centers for Disease Control and Prevention’s (2011) definition, indicating that they have experienced some degree of patient health “illiteracy” when examining patients (see Figure 7). Most physicians defined it in terms of language, educational literacy or level of

understanding without taking into account the patient's capacity to obtain health information and health services. According to the National Action Plan to Improve Literacy, quality of clinician–patient communication can affect patient health outcomes, including how well patients follow instructions from clinicians but few health care professionals receive formal training in communication, particularly in working with people with limited literacy, so these results are not uncommon (U.S. Department of Health and Human Services, 2010). However, the analysis of the quality of the physician recommended web sites did find six of the thirteen sites contained low health literacy, easy to read or resources in a language other than English, so some of the physicians were actually providing these types of resources to patients similar to the targeted health communication models suggested in the Kreuter and McClure (2004) study (see Table 3). Ironically only three physicians expressed concern for patient health literacy among their patients when defining it, and of those three, only one mentioned recommending the Family Doctor web site, which contains health information in Spanish, to their patients.

The use of electronic medical records, computers in the examination room and direct input of data by the physician appears to enhance physician productivity. Technology was mostly used for computer supported work methods by the physicians rather than as a physician/patient communication tool. All of the physicians maintained personal email accounts but none chose to actively communicate with their patients via professional email instead expressing a legitimate concern with the level of encryption in their email systems and those of their patients' email accounts (see Figure 6). Other reasons for not communicating with patients via email were time required to read and

answer email, and the desire to maintain personal boundaries by not being accessible to patients 24 hours a day and seven days a week. This indicates that email would not be a feature that family physicians would utilize in an electronic medical records system. The physicians probably would prefer a more secure form of professional communication with patients such as an encrypted patient portal with HIPAA compliant levels of encryption.

Nine of the physician practices were utilizing electronic medical records systems. However some had invested in earlier versions and were in the process of upgrading their systems due to the compliance requirements of the Patient Protection and Affordable Care Act and the Health Information Technology for Economic and Clinical Health Act recently passed by the U.S. Congress (Blumenthal, 2011). The physicians mentioned problems with integration of systems when referring patients to specialists in other hospitals and having to “wait for the mail” but those who worked in medical center owned clinics or large private practices valued the ability to communicate patient information with other healthcare “co-workers” electronically.

Evaluation of the task structure charts demonstrated the steps involved in the *physician examining patient* activity. All physicians expressed a sense of autonomy in their organization of work during the examination process in regard to their use of tools, adherence of rules and division of labor. However, they independently self-reported the same “set” of six subtasks performed during the *physician examining patient* activity, with the only difference being the order of subtask completion. This was true regardless

of the physician's age, gender, years practicing medicine, type of practice or whether they utilized electronic medical records, computers in the examination room, traditional medical charts, low tech medical instruments or high tech medical instruments during the examination. Of interest from the analysis of the data and the evaluation of the diagrams, was the recurring "sameness" of the physicians' activities. According to the physicians' data obtained from the North Carolina Medical Board (2011), all attended medical school in the United States with six of them attending medical school in North Carolina. This indicates that this "sameness" may be attributed to the physicians' medical school physician/patient examination and/or relationship training, which is one of the most commonly assessed qualities of students in medical schools. (Elcin, Odabasi, Gokler, Sayek, Akova and Kiper, 2006). This "sameness" behavior may also be attributed to the absence of observation in the interviewer's data collection process creating an inability to detect possible variations in actual behaviors.

Productivity is a measure of effective use of resources and is expressed as a ratio of output to input. In this study the output was defined as number of patients examined and the input was defined as number of physician labor hours spent examining patients. In order to better evaluate productivity value comparisons you must also evaluate the characteristics of the workplace that effect productivity (Stevenson, 2011). In the case of the family physician practices those factors that influence productivity values were efficient utilization of support staff, organization of workflow, type of business model, patient population served, patient volume and efficient use of technology. The analysis of

the work organization of the physicians with the three highest and two lowest productivity values demonstrated how those factors influenced productivity values.

There was no recognizable difference in productivity between physicians in regard to type of medical practice or division of labor. However recognizable characteristics of the physicians with higher productivity emerged. Some of those characteristics were: (1) Highly organized office support staff, (2) Utilization of electronic medical records, (3) Utilization of either a laptop or tablet computer in the examination room, (4) Physician's direct input of data into the electronic medical record during the examination, (5) Physician suggested eHealth resources linked directly to their practice's web site or specific sites suggested routinely for chronic disease management. These characteristics that emerged were similar to findings from the Wensing et al. (2006) study suggesting methods to improve knowledge management and patient outcomes.

There were 17 intended outcomes the physicians hoped to have achieved when they left the examination room, that were combined in Figure 9 from the individual *physician examining patient* activity diagrams (see Appendix F). The intended outcomes were: (1) resolution of patient's concerns, (2) make the correct diagnosis, (3) develop a plan to cure the problem, (4) patient satisfaction, (5) determine or address the patient's specific problem, (6) patient's understanding of their treatment plan, (7) addressed the patient's questions, (8) helped the patient, (9) patient is more confident, (10) patient is informed about their condition, (11) patient's understanding, (12) answers patient's

questions, (13) improve the patient's health, (14) modify the patient's disease behavior, (15) alleviate the patient's suffering, (16) diagnose the problem, and (17) set up treatment for the patient. These responses indicate that the physicians are more interested in the quality versus the quantity of their patients' examination outcomes since these measures are more qualitative than quantitative or quantifiable.

### ***Limitations of Study***

The limitations of this study include the following: number of participants, interview method, physician demographics, components of activity diagrams, components of task structure charts and productivity measurements. Another limitation was that the *physician examining patient* activity was evaluated excluding the patient being examined activity and the community's role in the activity that were occurring simultaneously. This limitation could be overcome by observation of the work environment and interviewing the other "actors" in the examination activity.

The participant population consisted of a convenience sample of ten family physicians which limited the amount of information and data obtained for analysis. Due to the convenience sample of ten physicians not being a probabilistic sample of the target population, the findings from this study cannot be generalized to the population of all family physicians in North Carolina. This limitation could be overcome in future studies by designing a better recruitment method, with non-reliance on email as a

contact/communication method, or possibly recruiting through a family physician professional organization.

The limitation of the telephone interview method was that even though it accommodated physicians' schedules, it did not allow for any observation of the physician by the interviewer nor any observation of the physicians' work environment being studied that would have provided nonverbal and visual cues. This limitation also constrained the interpretation of the study's results by eliminating additional insight into the physicians' responses that would have been provided through body language and facial expressions in a face-to-face interview.

The limitations of the physicians' demographics, components of the activity diagrams, components of the task structure charts and productivity measurements were that they were based upon physicians' self-reported data and perceptions of what is occurring. Therefore, the results assume that the physicians' responses are an accurate reflection and indicator of observable behavior. In addition the productivity values may have been influenced by the physician's facility layout, business model, use of technology, organization of support staff, patient volume and/or patient populations served which were not observed. These limitations could be overcome in future studies by conducting face-to-face interviews in the workplace, where the physicians' work environment could be observed firsthand thus limiting the need for self-reported data.



## **Chapter VI. RECOMMENDATIONS AND CONCLUSIONS**

### ***Recommendations***

In addition to defining the eHealth information niche, this study was undertaken to answer the following questions:

1. How does the introduction of eHealth information into the family physician/patient examination process impact clinical workflow?
2. What are the potential barriers, challenges or improvements to physician/patient examination and communication effectiveness created by patient eHealth information introduction?
3. What process improvements or best practices may be developed to better manage patient-introduced eHealth information that could enhance the productivity of the physician/patient examination process?

Even though this study interviewed a convenience sample of North Carolina family physicians, and the values used to calculate physician productivity were self-reported, the findings still indicate that physicians have developed methods to integrate

eHealth information into the physician/patient knowledge transfer process and it is clearly a tool utilized during the *physician examining patient* activity as evident by the activity diagrams and its inclusion as a sub-subtask in the task structure charts. It has mainly impacted clinical workflow by adding another sub-subtask to the “Communicates with patient” subtask in the *physician examining patient* activity by creating an “involuntary” tool for the physician to use and address during the examination process.

The potential barriers and challenges to physician/patient examination effectiveness created by the introduction of eHealth information are the subtraction of physician/patient quality time discussing information about symptoms, medication side effects and diseases unrelated to the patient’s health concern. The potential improvements to physician/patient examination effectiveness created by patient eHealth information introduction are the physicians’ development of new methods for distributing and suggesting health information to their patients. However, no systematic guidelines, policies or procedures for recommending eHealth information to patients emerged from the physicians’ responses but rather an ad hoc combination of linking online resources to their practice web sites, verbally suggesting web sites, distributing printouts and brochures, and referring patients to vendor recommended licensed content linked to electronic medical records systems.

Process improvement areas or opportunities to develop best practices for managing eHealth information that emerged from the study were the division of labor between the physician and their staff supporting the activity of examining patients. After

modeling the physicians' workflow with task structure charts and activity diagrams the support staff's main role emerged as to enhance practice workflow efficiency while the physician's main role was to improve the overall effectiveness and quality of the physician/patient examination. This was indicated by the qualitative nature of the objects and outcomes categories of the *physician examining patient* activity (see Figure 9). Of interest is that "diagnosis" was mentioned as both an object and an outcome by the physicians, indicating that problem resolution may be the overall goal of the patient examination for these physicians.

The physicians' responses contained detail about how support staff was responsible for placing the patient in the examination room, checking their vital signs, taking their initial history, checking for immunizations needed, prepping patients for suturing/minor outpatient surgery and taking care of patient follow-up. All of these tasks can potentially increase patient volume and examination efficiency. This support enabled the physician to spend "quality" time with the patient thus increasing the effectiveness of the examination, diagnosis and treatment.

One issue physicians mentioned was the amount of time spent providing information for audits to insurance companies and government entities such as Medicare. Electronic medical records systems provided ease of storage and retrieval of documentation needed for these types of audits for the practices that had implemented electronic medical records. All physicians should utilize their electronic medical records

systems for this type of information storage and management to facilitate audits by regulatory agencies and compliance of rules, laws and regulations.

Other interesting practice business model issues mentioned by the physicians were: (1) the current trend of hospitals buying private practices from Family Physician Nine and (2) the institutional guidelines and goals being developed for monitoring physician response time for patients through the medical center *admissions group* from Family Physician Six. If private practice business models are indeed changing and patient response time is being monitored for process improvement in medical center owned clinics, then in the future, electronic medical records systems may become a “tool” used to justify practice purchase price and/or document response time efficiency goals attained.

### ***Conclusions***

This study indicates that physician workflow and process efficiency improvements may be gained by moving the eHealth information niche currently residing in the physician/patient examination activity, and the recommending of eHealth information sites that coincides with it, by delegating it to the office support staff. This workflow model is similar to the model currently in the urgent care center described by Family Physician Three.

This could be accomplished by simply tagging patients as eHealth seekers in their medical chart/electronic medical record, to remind the staff to discuss this type of information during the staff/patient encounter, prior to physician/patient examination. This method of tagging could also be utilized for patients with low health literacy, language comprehension and cultural issues to alert the support staff to direct the patient to “easy to read” resources and resources in their native language. This could be accomplished with minimal support staff training in the areas of health literacy, evaluation of eHealth information and electronic medical records systems. Utilizing these changes in process may minimize eHealth information introduction’s effect on the examination and knowledge transfer effectiveness by ensuring that only “quality” eHealth information is discussed during the physician/patient examination.

This study indicates a need for the development of policies, procedures and best practices for integrating eHealth information into medical practice workflow to replace the ad hoc methods currently being utilized. Developing these types of guidelines has the potential to improve operational efficiencies for the medical practice. Improving operational efficiencies could improve physician productivity and enhance quality of patient care by optimizing time spent with the patient during the physician/patient examination activity. Additional studies should also be conducted to determine best practices for integrating eHealth information with electronic medical records and utilizing ePatient portals for secure, HIPAA compliant, physician/patient communication to enhance workflow efficiency optimization and knowledge transfer effectiveness. This can best be accomplished through continuing education for both the physicians and their

support staff, work studies to evaluate redundancy in the *physician examining patient* activity and moving the eHealth information tool from the physician's activity tool kit to the support staff's activity tool kit.

In addition this study may offer more opportunities for research in Information Science, specifically work studies involving human/computer/information interaction. With the implementation of electronic medical records systems occurring in physicians' clinical practices and their subsequent integration with pharmacy and hospital systems, this type of research may offer insight into new design methods for integrating eHealth information with patient electronic medical records systems to support physician/patient examination process improvement. Future researchers interested in eHealth information and physician/patient communication might examine the role of new or next generation technologies and their impact on clinical workflow, process improvement or early adopters in the medical field.

As the literature suggests and this study supports, patients are continuing to seek health information online (Eudy, 2010) and family physicians have managed to integrate its introduction into their work methods. However, this study pinpointed three strategic areas where improvement within the process may improve the physician/patient knowledge transfer process such as: (1) utilizing electronic medical records, computers in the examining room and input of data by physicians during examination to improve physician productivity and reduce human error, (2) delegating to support staff the discussion of eHealth information and the linking of web sites to patient's electronic

medical records, ePatient portals and medical practice web sites to increase physician/patient “quality” time during the examination activity, (3) developing best practices for annually evaluating resources suggested by physicians or linked to physician’s medical practice web sites for any changes in content, sponsorship of sites and ability to support patient health literacy. By utilizing technology, delegating duties and developing best practices more physician time should emerge for practicing medicine and less time choosing and critiquing health related web sites which could result in improving the physician’s examination goal of providing better patient health outcomes.

<b>Table 1. Reasoning Behind Physician Interview Questions</b>		
#	<i>Interview Question</i>	<i>Reason for Asking Question</i>
1	How would you describe your practice of medicine? <i>Probe if necessary:</i> for example private practice, hospital, medical school	To better characterize the work they do, and/or their practice of medicine.
2	Do you communicate with your patients via email? <i>Probe:</i> Why or why not?	To determine if they communicate electronically with their patients, and why or why not
3	Does your practice use electronic medical records? <i>Probe:</i> Why or why not?	To determine if they currently maintain medical records in electronic format, and why or why not.
4	How many days a week do you schedule patient appointments?	To determine how many days a week they examine patients, and/or work.
5	How many patients do you see each week?	To determine how many patients they see each week. (This will be used with Question #5 answer to calculate how many patients they see on average each day.)
6	What does the phrase “patient health literacy” mean to you? <i>Probe: Are you concerned about your patients’ health literacy?</i>	To determine if they are familiar with the term “health literacy” and what it means to them.
7	List the steps you follow when interacting with a patient from the time you enter the examination room until you exit the room. <i>Probe for tools:</i> Do you use a computer in the examining room? Do you use medical instruments such as blood pressure monitor, stethoscope, ear scope, tongue suppressor? Do you reference their medical record, lab results, diagnostic tests results? Do you talk to the patient? Do you talk to the patient’s family if they are present? Do you record information into their medical record?	To determine the steps involved in the activity of examining a patient. The probing questions are to determine what types of “Tools” they use to complete the activity system diagram.
8	What is the main focus of your activity during the patient’s examination in the steps you listed above? <i>Probe if needed:</i> the patient, the patient’s health, diagnosis of the problem, other?	To determine what the “Object” or objective(s) of the activity “Physician examining patient” is, to complete the activity system diagram.
9	What is the main result and/or outcomes you hope to have achieved when you exit the patient examination room? <i>Probe if more than one is mentioned to prioritize.</i>	To determine what the desired “Outcome” of the activity “Physician examining patient” is, to complete the activity system diagram.
10	In the past 7 days have any of your patients brought health information they found on the internet to their examination? ( <i>If no, then past 30 days? If no, then past 60 days? If no then omit questions 11 and 12.</i> )	To determine if their patients introduce internet health information into the examination activity.
11	(If yes in #10 then ask), Was the health information your patient found on the internet directly related to their disease or health condition?	To find out if the patient-introduced internet information relevant to their health condition to the physician.
12	Did you discuss the information with your patient?	To determine if the physician takes the time to discuss the internet health information during the activity of “Physician examining patient”.



13	(If yes in #12 then ask), Where did the discussion occur in the steps outlined in the generic patient examination activity above?	To determine where in the activity of “ <i>Physician examining patient</i> ” the discussion of internet health information occurs.
14	How many employees other than physicians do you work with in your practice?	To determine the “ <i>Community</i> ” in the “ <i>Physician examining patient</i> ” activity system diagram.
15	What are the titles of these employees? ( <i>Probe: i.e. nurses, nurse practitioners, physician’s assistants, administrative assistants, medical technologists?</i> )	To determine the “ <i>Division of Labor</i> ” in the “ <i>Physician examining patient</i> ” activity system diagram.
16	How do these other employees support the activity of examining patients?	To determine the “ <i>Division of Labor</i> ” in the “ <i>Physician examining patient</i> ” activity system diagram and/or other activities that affect this activity.
17	Does your practice have a policy to refer patients to internet health information? ( <i>If no, omit questions 18 and 19.</i> )	To determine if a process is in place to address the introduction of internet health information into the “ <i>Physician examining patient</i> ” activity and/or other activities that affect this activity.
18	(If yes in #17 then ask), Who is designated to refer the patient to internet health information in your practice? ( <i>Probe: Where/How does this occur? During examination, after examination, follow-up visit, sent to patient later?</i> )	To determine, (if a process is in place), who is designated or what the process “is” for referring patients to internet health information to determine other activities that affect the “ <i>Physician examining patient</i> ” activity.
19	In what format do they give the suggested resources to the patient? ( <i>Probe: word document?, brochure?, email attachment?, information prescription?</i> )	To determine in what format and/or delivery mode is used to give the internet health information to the patient. To determine “ <i>Tools</i> ” for other activity system diagrams.
20	Other than local, state, HIPAA and other federal laws what additional rules, guidelines, policies or procedures are you expected to follow when examining patients?	To determine “ <i>Rules</i> ” for the “ <i>Physician examining patient</i> ” activity diagram and any other activities.
21	In what year were you born?	To determine the participant’s age.
22	In what year did you start practicing medicine?	To determine how long the physician has been practicing medicine.
23	What is the interviewee’s gender?	To determine the participant’s gender.
24	What is interviewee’s race?	To determine the participant’s race/ethnicity.

<b>Table 2. Physician Practice, Demographics, Labor and Productivity</b>							
<b>Physician</b>	<b>Practice</b>	<b>MD</b>	<b>School*</b>	<b>EMR</b>	<b>Community</b>	<b>Division of Labor</b>	<b>Productivity</b>
<b>Family Physician One</b>	Medical Center Clinic	18 yrs	UCO	Yes	Nurses, Medical Office Assistants, Instructing Assistants, Administrative Clerks, Medical Residents	Nurse assists Physician	3.00 patients/hour
<b>Family Physician Two</b>	Group Private Practice	6 yrs	UNC	Yes	LPNs, CNAs, Schedulers, Front Office Personnel, Practice Manager, Clinical Care Coordinator, Front Office Manager, X-ray Tech	LPN and CNA assist Physician	2.66 patients/hour
<b>Family Physician Three</b>	Urgent Care Center	5 yrs	ECU	Yes	Nurses, Medical Assistants, Administrative Staff, X-ray Technicians, Lab Technicians	Nurse and Medical Assistant assist Physician	3.13 patients/hour
<b>Family Physician Four</b>	Solo Private Practice	24 yrs	UNC	No	Office Manager, Receptionist, Nurse Assistant	Nurse Assistant assists Physician	2.08 patients/hour
<b>Family Physician Five</b>	Medical Center Clinic	9 yrs	U Cinn	Yes	CNAs, LPNs, RNs, Referral Clerk, Receptionists, Lab Technicians, Radiology Technicians	LPN and CNA assist Physician	2.25 patients/hour
<b>Family Physician Six</b>	Medical Center Clinic	34 yrs	UMD	Yes	LPNS, Lab /techs, Medical Assistants, Nursing Supervisor, Radiology Techs and Administrative Personnel	LPN and Medical Assistant assist Physician	1.50 patients/hour
<b>Family Physician Seven</b>	Medical Center Clinic	5 yrs	UNC	Yes	Front Desk Supervisor, Office Manager, Phlebotomist, Radiology Technician, Medical Assistant	Medical Assistant assists Physician	2.33 patients/hour
<b>Family Physician Eight</b>	Medical Center Clinic	24 yrs	Duke	Yes	Nurses, Medical Assistants, Office Manager, Lab Technicians, X-ray Technicians, Referral Clerks	Nurse and Medical Assistants assist Physician	2.68 patients/hour
<b>Family Physician Nine</b>	Solo Private Practice	28 yrs	Temple	Yes	Business Office Staff, Nurse Practitioners, Nurse Aides	Nurse Aide assists Physician	4.17 patients/hour
<b>Family Physician Ten</b>	Group Private Practice	22 yrs	UNC	Yes	Receptionist, LPN, RN, Office Manager, Physician's Assistant	LPN and RN assist Physician	2.22 patients/hour

\*Note. Sources: NC Medical Board, <http://www.ncmedboard.org>. Other Table 2. data was obtained from the physician interview transcripts in Appendix D.

<b>Table 3. Physician Suggested Health Information Web Sites</b>				
<b>Name</b>	<b>URL</b>	<b>Type</b>	<b>Low Health Literacy Resources Available</b>	<b>Publisher</b>
American Academy of Family Physicians	<a href="http://www.aafp.org/online/en/home.html">http://www.aafp.org/online/en/home.html</a>	Professional	No	American Academy of Family Physicians
American Cancer Society	<a href="http://www.cancer.org/">http://www.cancer.org/</a>	Nonprofit	Spanish & Asian languages	American Cancer Society, Inc.
American Diabetes Association	<a href="http://www.diabetes.org/">http://www.diabetes.org/</a>	Nonprofit	Spanish language	American Diabetes Association
American Heart Association	<a href="http://www.heart.org/HEARTORG/">http://www.heart.org/HEARTORG/</a>	Nonprofit	Spanish & Asian languages	American Heart Association
eMedicine Health	<a href="http://www.emedicinehealth.com/script/main/hp.asp">http://www.emedicinehealth.com/script/main/hp.asp</a>	Commercial Contains ads	No	WebMD, Inc.
Family Doctor	<a href="http://familydoctor.org/online/famdocen/home.html">http://familydoctor.org/online/famdocen/home.html</a>	Medical, Professional Contains ads	Spanish language, large text	American Academy of Family Physicians
Healthfinder	<a href="http://www.healthfinder.gov/">http://www.healthfinder.gov/</a>	Government	Spanish language	National Health Information Center
Mayo Clinic	<a href="http://www.mayoclinic.com/">http://www.mayoclinic.com/</a>	Professional Commercial Contains ads	No	Mayo Foundation for Medical Education and Research
MedicineNet	<a href="http://www.medicinenet.com/script/main/hp.asp">http://www.medicinenet.com/script/main/hp.asp</a>	Commercial	No	MedicineNet, Inc.
MedlinePlus	<a href="http://www.nlm.nih.gov/medlineplus/">http://www.nlm.nih.gov/medlineplus/</a>	Government	Spanish language, tutorials	U.S. National Library of Medicine
Medscape	<a href="http://www.medscape.org/">http://www.medscape.org/</a>	Professional	No	Medscape, LLC
UpToDate for Patients	<a href="http://www.uptodate.com/patients/index.html">http://www.uptodate.com/patients/index.html</a>	Commercial	No	UpToDate, Inc.
WebMD	<a href="http://www.webmd.com/">http://www.webmd.com/</a>	Commercial Contains Ads	No	WebMD, LLC.

<b>Table 4. Physician Patient Health Literacy Definition Comparison</b>	
<b>Physician</b>	<b>Definition Compared to Components of the CDC's Definition*</b>
<b>1</b>	The ability to understand instructions and knowing how to follow instructions are the components of health literacy (2, 3, 5, 6).
<b>2</b>	I would take that to mean a patient's general understanding of health care and the human body and their own basic health and symptoms that they may have (2, 3, 5, 6).
<b>3</b>	How well-versed the patient is of the particular symptoms that they have, and their information knowledge (3, 6).
<b>4</b>	Patients being able to understand their disease or health concerns at a level in common with their level of education and they know what you are talking about (2, 3, 5, 6).
<b>5</b>	The patient has some understanding of their diagnoses and their treatments and what we can do for their problem (2, 3, 5, 6).
<b>6</b>	All of our materials are developed for different levels of education and languages (2, 3, 6).
<b>7</b>	At what level the patient is able to comprehend the information you are giving them and their different levels of comprehension say if they are Spanish speakers, they may not be able to read the handout (2, 3, 5, 6).
<b>8</b>	I would say that patient health literacy means being familiar with the language that we use when I try to explain the concepts (2, 3, 5, 6).
<b>9</b>	It means what they understand about their medicine and health (2, 3, 5, 6).
<b>10</b>	The ability of the patient to understand what you are communicating to them, and participate in their healthcare maintenance (2, 3, 5, 6).

\*Note Source: <http://www.cdc.gov/HealthLiteracy/>

Components of the Centers for Disease Control and Prevention's Health Literacy Definition: the capacity to (1) obtain, (2) process, and (3) understand basic health information and the capacity to (4) obtain, (5) process, and (6) understand basic health services to make appropriate health decisions.

<b>Table 5. Glossary of Health Care Terms</b>		
<b>Term</b>	<b>Definition</b>	<b>Acronym</b>
<b>Certified Nurse's Aide</b> (Variant(s): Nurse Aide, Nurse's Assistant)	a person who assists trained nurses or physicians by performing general services (such as taking vital signs)	<b>CNA</b> <b>NA</b>
<b>Clinical Care Coordinator</b>	a nurse who supervises the organization, coordination and scheduling of patient care in a primary care medical practice	<b>CCC</b>
<b>Electrocardiogram</b>	the tracing made by an electrocardiograph, an instrument for recording the changes or abnormalities of electrical potential occurring during the heartbeat	<b>EKG</b>
<b>Electronic Medical Record</b> (Variant: Electronic Health Record)	an electronic record of a patient's medical information such as medical history, care or treatments received, test results, diagnoses, and medications taken	<b>EMR</b> <b>EHR</b>
<b>Geriatrician</b>	a doctor who specializes in diseases and problems of old age	<b>none</b>
<b>Instructional Assistant</b>	a person who assists in the instruction, training and education of medical residents	<b>none</b>
<b>Laboratory Technician</b> (Variant: Lab Tech)	a person who processes laboratory tests (e.g., urine, blood) taken to examine or treat a patient	<b>none</b>
<b>Licensed Practical Nurse</b>	a person who has undergone training and obtained a license (as from a state) to provide routine care for the sick	<b>LPN</b>
<b>Medical Assistant</b> (Variant(s): Clinical Medical Assistant, Medical Office Assistant)	a person who performs common tasks under the direction of a physician which may include taking medical histories, vital signs, explaining treatment procedures to patients, preparing patients for examinations, and assisting physicians during examinations.	<b>none</b>
<b>Medical Record</b> (Variant: Medical Chart)	a record (usually tangible) of a patient's medical information such as medical history, care or treatments received, test results, diagnoses, and medications taken	<b>none</b>
<b>Medical Resident</b> (Variant: Resident)	a physician serving a period of advanced medical training and education that follows graduation from medical school and licensing to practice medicine	<b>none</b>
<b>Nurse Practitioner</b>	a registered nurse who through advanced training is qualified to assume some of the duties and responsibilities formerly assumed only by a physician	<b>NP</b>
<b>Phlebotomist</b>	a specially trained person who is certified to practice phlebotomy: the letting of blood for transfusion, diagnostic testing or experimental procedures	<b>none</b>
<b>Physician Assistant</b>	a specially trained person who is certified to provide basic medical services (as the diagnosis and treatment of common ailments) usually under the supervision of a licensed physician	<b>PA</b>
<b>Radiology Technician</b> (Variant: X-ray Tech)	a person who performs x-rays, or diagnostic imaging to examine or treat a patient	<b>none</b>
<b>Referral</b>	the process of directing or redirecting (as a medical case or a patient) to an appropriate specialist or agency for definitive treatment	<b>none</b>
<b>Registered Nurse</b>	a graduate trained nurse who has been licensed by a state authority after passing qualifying examinations for registration	<b>RN</b>
<b>Telemedicine</b>	the practice of medicine when the doctor and patient are widely separated using two-way voice and visual communication (as by satellite, computer, or closed-circuit television)	<b>none</b>
<b>Vital Signs</b>	the pulse rate, respiratory rate, body temperature, and often blood pressure of a person	<b>none</b>

Note. Sources: National Library of Medicine Medical Dictionary, <http://www.nlm.nih.gov/medlineplus/plusdictionary.html> and U.S. Department of Labor Bureau of Labor Statistics, <http://www.bls.gov/oco/ocos164.htm>, <http://www.bls.gov/oco/ocos014.htm>

<b>Table 6: Medical Practice Rules, Laws and Regulatory Agencies</b>		
<b>Title</b>	<b>Description</b>	<b>Acronym</b>
<b>Chaperone Rule</b>	The presence of a chaperone during the physical examination provides reassurance, respect for concerns, attention to the patients' well-being, and also provides legal protection for the physician in the event of any misunderstanding or false accusation on the part of the patient.	<b>none</b>
<b>Centers for Disease Control and Prevention</b>	The CDC is a federal organization that creates tools and information to protect the health of the public through health promotion, prevention of disease, injury and disability, and preparedness for new health threats.	<b>CDC</b>
<b>Clinical Laboratory Improvement Amendments of 1988</b>	The Clinical Laboratory Improvement Amendments of 1988 (CLIA) were enacted to establish quality standards for certain laboratory testing. These standards ensure the accuracy, reliability and timeliness of patient test results, regardless of where the test is performed. The standards are based on the complexity of the laboratory test method; the more complicated the test, the more stringent the requirements for the laboratory.	<b>CLIA</b>
<b>Department of Health &amp; Human Services</b>	The U. S. government's principal agency for protecting the health of all Americans and providing essential human services.	<b>DHHS</b>
<b>Drug Enforcement Administration</b>	The U. S. Drug Enforcement Administration enforces the controlled substances laws and regulations of the United States.	<b>DEA</b>
<b>Health Information Technology for Economic and Clinical Health Act</b>	The HITECH Act requires the Department of Health and Human Services' Secretary to prepare and submit annual reports on breach notifications and compliance with the Privacy and Security Rules promulgated under the Health Insurance Portability and Accountability Act of 1996 (HIPAA). The act also requires that each report be made available to the public online.	<b>HITECH</b>
<b>Health Insurance Portability and Accountability Act of 1996 Privacy and Security Rules</b>	The HIPAA Privacy Rule provides federal protections for personal health information held by covered entities and gives patients an array of rights with respect to that information and is balanced so that it permits the disclosure of personal health information needed for patient care and other important purposes. The HIPAA Security Rule specifies a series of administrative, physical, and technical safeguards to use to assure the confidentiality, integrity, and availability of electronic protected health information.	<b>HIPAA</b>
<b>Medical Malpractice Liability</b>	Medical malpractice occurs when a health care provider violates the governing standard of care when providing treatment to a patient, causing the patient to suffer an injury. Medical malpractice can result from an action taken by the medical practitioner, or by the failure to take a medically appropriate action.	<b>none</b>
<b>Occupational Safety &amp; Health Administration</b>	The U. S. Department of Labor, Occupational Safety & Health Administration is the main federal agency charged with the enforcement of safety and health legislation.	<b>OSHA</b>
<b>Patient Protection and Affordable Care Act of 2010</b>	The Patient Protection and Affordable Care Act puts into place comprehensive health insurance reforms that will hold insurance companies more accountable and will lower health care costs, guarantee more health care choices, and enhance the quality of health care for all Americans.	<b>PPACA ACA</b>
<b>Recovery Audit Contractors</b>	Persons who are contracted by the state to identify and recover overpayments and identify underpayments to Medicare and Medicaid	<b>RAC MAC</b>

Note. Sources: AMA: <http://www.ama-assn.org/resources/doc/code-medical-ethics/821a.pdf> , <http://www.ama-assn.org/ama/pub/physician-resources/solutions-managing-your-practice/coding-billing-insurance/medicare/recovery-audit-contractors.page>

CDC: <http://www.cdc.gov>, DEA: <http://www.justice.gov/dea/agency/mission.htm>,

Expert Law: [http://www.expertlaw.com/library/malpractice\\_by\\_state/North\\_Carolina.html](http://www.expertlaw.com/library/malpractice_by_state/North_Carolina.html)

OSHA: <http://www.osha.gov/about.html>, DHHS: <http://www.hhs.gov/ocr/civilrights/understanding/Section1553/>, <http://www.hhs.gov/ocr/privacy/hipaa/understanding/index.html>, <http://www.gpo.gov/fdsys/pkg/FR-2011-09-14/pdf/2011-23525.pdf>, <http://www.hhs.gov/ocr/privacy/hitechrepts.html>

## APPENDIX A: PHYSICIAN INTERVIEW QUESTIONS

Thank you for participating in this interview today. This interview should take approximately 30 minutes to complete. I would like to assure you that all of your responses will remain confidential. You will be assigned a participant code that will be used to maintain your anonymity. Your participant code for this study is FP####.

*(Hand the participant the confidentiality agreement to read and sign with their participant code already entered on the form.)*

By signing the confidentiality agreement you have agreed that your responses may be recorded on audiotape and you are guaranteed that no personally identifiable information will be linked to your recorded responses.

*(Turn on tape recorder.)*

### Interview Questions

1. How would you describe your practice of medicine? *Probe if necessary:* for example private practice, hospital, medical school
2. Do you communicate with your patients via email? *Probe:* Why or why not?
3. Does your practice use electronic medical records? *Probe:* Why or why not?
4. How many days a week do you schedule patient appointments?
5. How many patients do you see each week?
6. What does the phrase “patient health literacy” mean to you? *Probe:* Are you concerned about your patients’ health literacy?
7. List the steps you follow when interacting with a patient from the time you enter the examination room until you exit the room. *Probe for tools:* Do you use a computer in the examining room? Do you use medical instruments such as blood pressure monitor, stethoscope, ear scope, tongue suppressor? Do you reference their medical record, lab results, diagnostic tests results? Do you talk to the patient? Do you talk to the patient’s family if they are present? Do you record information into their medical record?
8. What is the main focus of your activity during the patient’s examination in the steps you listed above? *Probe if needed:* the patient, the patient’s health, diagnosis of the problem, other?
9. What is the main result or outcome you hope to have achieved when you exit the patient examination room? *Probe:* If more than one is mentioned.
10. In the past 7 days have any of your patients brought health information they found on the internet to their examination? *(If no, then past 30 days? If no, then past 60 days? If no then omit questions 11 and 12.)*
11. *(If yes in #10 then ask),* Was the health information your patient found on the internet directly related to their disease or health condition?
12. Did you discuss the information with your patient?

13. (If yes in #12 then ask), Where did the discussion occur in the steps outlined in the generic patient examination activity above?
14. How many employees other than physicians do you work with in your practice?
15. What are the titles of these employees? (*Probe: i.e. nurses, nurse practitioners, physician's assistants, administrative assistants, medical technologists?*)
16. How do these other employees support the activity of examining patients?
17. Does your practice have a policy to refer patients to internet health information? (*If no, omit questions 18 and 19.*)
18. (If yes in #17 then ask), Who is designated to refer the patient to internet health information in your practice? *Probe: Where/How does this occur? During examination, after examination, follow-up visit, sent to patient later?*
19. In what format do they give the suggested resources to the patient? (*Probe: word document?, brochure?, email attachment?, information prescription?*)
20. Other than local, state, HIPAA and other federal laws what additional rules, guidelines, policies or procedures are you expected to follow when examining patients?

I would also like to ask you a few more questions to allow me to better understand the characteristics of my interviewees.

21. In what year were you born?
22. In what year did you start practicing medicine?

*(Questions for the interviewer to answer by observation if possible)*

23. What is the interviewee's gender?
24. What is interviewee's race?

Thank you for agreeing to participate in this interview.

*(Ask if they would be willing to complete a brief online survey in the future relating to internet health information. If so, then ask them for their email address to send them the survey link or give them a printed copy of the survey link on the signed confidentiality form.)*

*(Turn off tape recorder.)*



## **APPENDIX B: LETTER OF INTENT TO PARTICIPANTS**

Dear NC Family Physician,

My name is Beth Ellington and I am a doctoral candidate at the UNC School of Information and Library Science. I am conducting research for my dissertation to determine if physicians in North Carolina have developed any unique work methods, policies or procedures to manage online health information introduced by their patients during the examination process. This study provides an opportunity for physicians to have a voice in the patient-introduced online health information discussion. My study has been approved by the UNC Behavioral IRB, #11-0664.

In order to complete the study, I am asking you to participate in a 30 minute interview, either via telephone or in person, in which you would be responding to the brief list of questions included with this letter. In addition to the interview questions, I have attached a copy of the consent form for the interview, which can be faxed, scanned, or mailed back to me if you agree to participate in a telephone interview.

Please contact me via telephone - cell (336) 675-6497, home (336) 227-4111, work (919) 962-0701 or email - [elliv@email.unc.edu](mailto:elliv@email.unc.edu) or [ellington.v.beth@gmail.com](mailto:ellington.v.beth@gmail.com) , to provide a date, time and contact information for me to reach you. I hope you will consider contributing to the discussion on patient-introduced online health information by participating in this study.

Sincerely,

Beth Elder Ellington

## **APPENDIX C: IRB APPLICATION AND CONSENT FORM**

### **IRB Application**

**Study #: 11-0664**

**Study Title:** How the introduction of internet health information by the patient affects physician workflow during the physician examining patient activity

**Study Description:**

Purpose: This study utilizes an Activity Theory model to create an activity system diagram for the activity of “Physician examining patient”. The elements to complete the diagram will be obtained from interviewing physicians. This activity system diagram should indicate how the introduction of internet health information by the patient during the examination process affects physician workflow.

Participants: 50 physicians licensed to practice family medicine in NC

Procedures (methods): Face-to-face or telephone interview

## CONSENT FORM

### Introduction to the study:

- We are inviting you to participate in an interview to collect information about physician workflow activities during the physician examining patient activity.
- Beth Ellington, a doctoral candidate in the UNC School of Information and Library Science, is conducting this interview as part of a research study.

### Purpose

- The purpose of this interview is to collect information about how the introduction of internet health information by your patient during the examination process affects your workflow. **We are using the information obtained in the interview to create an activity system diagram.**

### What Will Happen During the Study?

To be completed in 30 minutes:

1. You will be asked to complete an interview.
2. You will be recorded on audio tape during this interview.
3. If you have any questions or concerns about being in this study, you should contact Beth Ellington at (919) 962-0701 or Claudia Gollop at (919) 962-8362
4. If you have any questions about subjects' rights as research participants in this study you should contact UNC's IRB at (919) 966-3113.

### Your privacy is important

- We will make every effort to protect your privacy.
- We will not use your name in any of the information we get from this interview or in any of the reports.
- Any information we get during the interview will be recorded with a participant code.

### Risk and discomfort

- We do not know of any personal risk or discomfort you will have from being in this test.

### Your rights

- You decide on your own whether or not you want to participate.
- If you decide to participate, you will have the right to stop at any time.
- You may skip any specific question that you do not wish to answer for any reason.
- You will not be treated any differently if you decide not to participate.
- If you decide not to participate or to stop participating, this will not affect your relationship with those conducting the interview in any way.

### Consent

1. I have had the chance to ask any questions I have about this interview, and they have been answered for me.
2. I have read the information in this consent form, and agree to be interviewed. I also agree to be audio recorded, and I give my permission to the use of the audio for research purposes only if my identity is kept in reserve.
3. There are two copies of this form. I will keep one copy and return the other to those conducting the interview.

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Signature of participant

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Date

---

Signature of person obtaining consent

---

Date

## APPENDIX D: PHYSICIAN INTERVIEW TRANSCRIPTS

### Interview One Transcript Family Physician One

Thank you for participating in this interview today. This interview should take approximately 30 minutes to complete. I would like to assure you that all of your responses will remain confidential. You will be assigned a participant code that will be used to maintain your anonymity.

*(Hand the participant the confidentiality agreement to read and sign with their participant code already entered on the form.)*

By signing the confidentiality agreement you have agreed that your responses may be recorded on audiotape and you are guaranteed that no personally identifiable information will be linked to your recorded responses.

*(Turn on tape recorder.)*

#### Interview Questions and Answers

*PI: List the steps you follow when interacting with a patient from the time you enter the examination room until you exit the room.*

FP1: I guess it depends on how much detail you want. I usually come in if it is not someone I know then I will introduce myself. If it is someone I do know typically we will have a few words and just some small talk and general chat. I ask them what I can do for them today. I tend to sit down more than I stand. I sit down and then I listen to their chief complaints and their history. Typically then I do an examination, and then review what I found and what findings we have and where we need to go from there. Typically then I will view the electronic medical records and get any prescriptions in the computer. We will wrap things up and then head back out to the checkout counter where our printer is so I can get prescriptions and lab slips from there. Then make a follow up appointment.

*PI: What do you use besides the computer in the examining room? Do you use things like a stethoscope , blood pressure monitor?*

FP1: I tend not to well, in most cases or in all cases the patients will have their vital signs are done before I get in the room, but in some cases I will end up repeating a blood pressure. Do you want further instruments that I might use?

*PI: Yes.*

FP1: Obviously the stethoscope, otoscope , ophthalmoscope, mirror tucked on the wall, a

monofilament for testing neuropathy in diabetics, which else, tongue depressors and that's about it as far as medical instruments. Are you looking for other computer instruments for example?

*PI: Do you reference their medical record, electronic medical records, lab results or diagnostic test results?*

FP1: Yes, I do that. I tend to spend less, as little time on the computer as I possibly can. I tend not to, I generally don't, type while I am listening to them or do anything rather than listen kinda one on one taking notes. More often than I use the computer to access their record or recent lab results, more often than not I am using my iPhone as a medical resource looking up prescriptions for example.

*PI: Do use like a smartphone, also?*

FP1: Yes

*PI: Okay, what is the main focus of your activity during the patient's examination in the steps you just listed? And it can be more than one thing you are focusing on but what is the main focus?*

FP1: I couldn't hear you completely there. I am not quite sure.

*PI: When you are examining the patient, what is your main focus, for example: the patient, the patient's health, diagnosis of the problem or is it the patient as a whole?*

FP1: Oh, okay there are probably two components then. In all cases, well there are actually a few situations where you may not do an exam, but there will be two parts. There is part of an exam that you are doing that is focused on the presenting problem and may be even for diagnostics. Part of the exam in some cases may be more therapeutic than that. If someone comes in and makes a real effort even if there is not a whole lot that I need to examine, I will still put my hands on them and listen to their heart and listen to their lungs. And some of that is because sometimes you will hear a patient complain that they saw a particular doctor and they never even touched them so I make a concerted effort that I do some sort of an exam even though that there may not be a whole lot that I am actually looking for, I think it is important to put my hands on them to make sure that there is part of that interaction.

*PI: What is the main result or outcome you hope to have achieved when you exit the patient examination room?*

FP1: Literally resolution of, or decrease the patient's concerns, or resolution of whatever their problem was that they presented with. Sometimes that may not be a complete diagnosis but it may just be an acknowledgement of the symptoms that they have and an agreement to evaluate them. Literally the goal ends up being resolution of as much as you can of what their presenting concern was.

*PI: In the past 7 days have any of your patients brought health information they found on the internet to their examination?*

FP1: No they have not.

*PI: Okay, what about the past thirty days?*

FP1: Probably one.

*PI: Was the health information your patient found on the internet directly related to their disease or health condition?*

FP1: It was related to their perception of their disease. It was accurate information but it was not necessarily pertaining to their diagnosis. It was more based on what they thought was going on or actually what a neighbor thought was going on.

*PI: Did you discuss the information with your patient?*

FP1: Yes, I do not have a choice.

*PI: Where did the discussion occur in the steps outlined in the generic patient examination activity above?*

FP1: It was later, in the process is actually where when they bring this information. I will acknowledge it before I begin, I will sort of glance at it and sort of set it aside until I evaluate them and make the decision or have an idea of what I think is going on and then I will look at it more closely to see whether it coincides or whether it is different. It is generally in the discussion basically where we are reviewing findings or lab results and we will incorporate that information they brought in into the equation. Sometimes it may be very useful, such as great information in a lot of cases they bring in information that is not as useful or pertinent and we discuss that.

*PI: Okay.*

FP1: In my case it is actually more often than not it is more disruptive and I kind of have to take an unnecessary tangent to review what they brought in and more often than not I have to refute what their neighbor thinks is going on or someone else thinks is going on and explain why that is not the correct diagnosis. In many cases it makes the visit longer and more cumbersome.

*PI: How many employees other than physicians do you work with in your practice?*

FP1: We have a huge academic practice, so they're the largest that run the clinic management of sorts. In the actual patient care area we've got nurses, medical office assistants, instructing assistants, administrative clerks and residents.

*PI: How do these other employees support the activity of examining the patient?*

FP1: Most of them have very little to do with the exam itself other than the nurses who initially evaluate and bring the patient in and doing their vital signs and in some cases look over their blood sugar or cholesterol results.

*PI: Does your practice have a policy to refer patients to internet health information?*

FP1: Um, in terms of internet health information, no no formal policy, and I think most of us have a few sites like Medscape for example or WebMD that are considered known and trusted and have more worthy information and we will work more to get people to those sites as opposed to just whatever comes up on Google.

*PI: Who is designated to refer the patient to internet health information in your practice?*

FP1: That would be the primary care physician, but it is not formally designated.

*PI: Where/How does this occur? During examination, after examination, follow-up visit, sent to patient later?*

FP1: Typically it would be after the examination is where we would be discussing the problem and determining what we are going to do for an evaluation. I will ask them if they say gosh I have more questions or they will ask can I read more about this or if they are the inquisitive type or if they have brought in some information from the internet that may not be accurate that's when I will bring up to them that here's a good site that you can look at.

*PI: Other than local, state, HIPAA and other federal laws what additional rules, guidelines, policies or procedures are you expected to follow when examining patients?*

FP1: I don't know of any others. The nice thing about being in an academic practice and our academic practice is included is that there are fewer regulations and fewer stipulations on how you do things as long as you are following good medical practice, so we are primarily covered by state and federal laws and not so much by current policy.

*PI: What does the phrase "patient health literacy" mean to you?*

FP1: The ability to understand instructions and to know how to follow instructions are the components of health literacy.

*PI: How would you describe your practice of medicine?*

FP1: An academic medical clinic, *name of employer* is a very large physician group that is all a multi-specialty group. We are all employees and faculty at the medical school.

*PI: Do you communicate with your patients via email?*

FP1: I do, I prefer not to but I occasionally will.

*PI: Why?*

FP1: I typically don't initiate an email conversation with a patient except in very, very few circumstances and I will reply to an email from a patient. I don't encourage it.

*PI: Does your practice use electronic medical records?*

FP1: We do use an EMR, yes.

*PI: Why?*

FP1: *Name of employer* requires it.

*PI: How many days a week do you schedule patient appointments?*

FP1: Me personally or the clinic? Me personally, I usually see patients typically four to five ½ days per week. I see patients most every day.



*PI: How many patients do you see each week?*

FP1: On average I will see 12 per half day.

***I would also like to ask you a few more questions to allow me to better understand the characteristics of my interviewees.***

*PI: In what year were you born?*

FP1: 1965

*PI: In what year did you start practicing medicine?*

FP1: I started practicing, I guess it depends practice post-residency or pre-residency. I graduated from medical school in 1990, finished residency in 1993 so probably 1993 is when you would consider I started independent medicine.

*PI: What is your gender?*

FP1: Male

*PI: What is your race?*

FP1: Caucasian

Thank you for agreeing to participate in this interview.

***(Turn off tape recorder.)***

## **Interview Two Transcript**

### **Family Physician Two**

Thank you for participating in this interview today. This interview should take approximately 30 minutes to complete. I would like to assure you that all of your responses will remain confidential. You will be assigned a participant code that will be used to maintain your anonymity.

*(Hand the participant the confidentiality agreement to read and sign with their participant code already entered on the form.)*

By signing the confidentiality agreement you have agreed that your responses may be recorded on audiotape and you are guaranteed that no personally identifiable information will be linked to your recorded responses.

*(Turn on tape recorder.)*

#### **Interview Questions and Answers**

*PI: List the steps you follow when interacting with a patient from the time you enter the examination room until you exit the room.*

FP2: Well that really depends a lot on exactly why they are coming into the office. So, you always say hello and introduce myself particularly to the patients that I don't know and ask them why they are here, um, coming into the office today? Sometimes you already know that because people have scheduled a physical or my nurse has sort of triaged why the patient is there. Um, and then I talk to them and try to ask them why they are there and then hone in on just taking a good history, and then doing a physical exam, that's pertinent for the problem or do a complete physical if they are there for a physical.

*PI: Do you use a computer in the examining room or any medical instruments in particular?*

FP2: Well yea, we, my practice is fully on the EMR, so I probably 90% of the time bring a laptop into the room with me. I can type very fast so I just put the laptop in my lap and try to type what the patient is saying. So I can type pretty quickly without looking at the keyboard. And what tools we use, we use a stethoscope, and depending upon what the problem is you could use reflex hammers, lots of other different little tools but it really just depends upon what the exact problem is.

*PI: So you said you referenced their EMR. Do you reference their lab results and diagnostic tests and those types of things too?*

FP2: Yea, well it depends on what the problem is. So you know if somebody has come in and they just have a sore throat or a cold or they've got an acute injury. In more than 50% of my practice is pure sports medicine or musculoskeletal problems so I wouldn't do that if somebody is coming in with a shoulder problem, or knee or ankle problem. But if somebody particularly if they come in for a physical or if they've got, you know, diabetes or high blood pressure or something like that then I would I usually like to show them the screen to show them what their numbers or what their labs look like.

*PI: What is the main focus of your activity during the patient's examination in the steps you just listed?*

FP2: Oh, that's a tough question to answer because I think it is very problem specific so if you have an acute knee injury you are going to focus on the knee history or do the exam that is specific to that. You would treat a complete physical exam very, very different and try to make that a lot more patient focused, overall health focused and basically go over all they see and basically all the recommended screenings that need to happen or age appropriate exam. So then I don't think I can give you a full answer for what I do each time because I think that changes every time that you go into the room

*PI: What is the main result or outcome you hope to have achieved when you exit the patient examination room? Probe: If more than one is mentioned.*

FP2: You like to make the correct diagnosis and come up with a plan that will cure the problem or help the patient.

*PI: In the past 7 days, have any of your patients brought health information they found on the internet to their examination?*

FP2: I can't remember I don't know in the past seven days probably in the last couple of weeks I would say yes.

*PI: Was the health information your patient found on the internet directly related to their disease or health condition?*

FP2: You know most commonly people will come in with printouts about medications and they will look up some of their different medications and side effects profiles and will come in with different questions about that or they will come in with things they have printed out about symptoms that they have got potential answers.

*PI: Did you discuss the information with your patient?*

FP2: Yes, and I guess going back to that other question, sometimes they will come in with things I have pointed them to, like stuff from the American Diabetes Association or the American Heart Association but often times they will just print things out on different medications or different symptoms.

*PI: Where did the discussion occur in the steps that you outlined in # 1 for the generic patient examination activity?*

FP2: I think usually when people bring things in, they have got that on the forefront of their mind so I would just try to address those questions or kind of any questions towards the beginning of the exam. So I try to answer questions, like any questions or key questions they come in with or any internet type questions at the beginning.

*PI: How many employees other than physicians do you work with in your practice?*

FP2: Now my practice is huge so I am gonna not say practice but use this more just in my site or my office and for this I teach also so I am just going to use my private practice office because it is probably more relevant to these questions. We have about 25 people who work in the office and your next question, what are the titles of these employees? We have a few LPNs, six CNAs, we have schedulers and people who work in the front office, we have a practice manager, we have a clinical care coordinator who does our referrals and things like that, we've got there is also sort of a front office staff manager, we've got an X-ray tech and two full monitors.

*PI: How do these other employees support the activity of examining the patient?*

FP2: Well, the people who work in the front office, take patients phone calls, and they schedule appointments and check them in when they come in and take their co-payments and run the insurance information. The nurses will call the patients back and take their vital signs and really assist in the patient care activities, so like when you need chaperones for a breast exam or a pelvic exam, or you need injections of vaccines drawn up or if you need assistance with procedures or other nursing, nurse duties to assist in just seeing patients. I hope that was enough of an answer. They also do some stuff like on physicals they will review people's vaccine statuses and if they are delinquent for certain vaccines things like that they will make a note of that and they will go ahead and give them a flu shot if they want one.

*PI: Does your practice have a policy to refer patients to internet health information?*

FP2: It is provider specific so no we do not have a formal policy so each person handles all that information differently.

*PI: How do you provide that information to them? Do you give them a handout or just make suggestions of handouts? You mentioned the American Diabetes Association and the American Heart Association.*

FP2: It is all very problem specific so I do a lot of sports medicine and orthopedics so there are hundreds of handouts for different conditions and rehab programs and that comes from a variety of settings from things that I have found from large teaching programs in the country. For basic conditions the handouts in our EMR are pretty good for a few things like diabetes, high blood pressure, cholesterol things like that. I will point them to specific web sites and they have many things that are on there that they can read, so for instance, the American Diabetes Association has dozens and dozens of high quality information about diabetes and I always caution patients that you should not go and just Google certain disease conditions that many times that information that they just randomly find will not be necessarily good advice or accurate. I try to point them to accurate or reliable information, often times I tell them that if they want to go and look for things on their own that WebMD is a good resource.

*PI: Other than local, state, HIPAA and other federal laws what additional rules, guidelines, policies or procedures are you expected to follow when examining patients?*

FP2: I think we just follow HIPAA and general guidelines. You follow general doctor/patient relationship and privacy rules. In private practice you have less formal guidelines to follow than you would have to follow like you would have to do for UNC. We have OSHA standards and things that we have to do as a health care facility but I am not sure if any of that directly relates impacts to how you would deal with patients. Of course you would follow DEA laws and things like that.

*PI: What does the phrase “patient health literacy” mean to you?*

FP2: I would take that to mean a patient’s general understanding of health care and the human body and their own basic health and symptoms that they may have.

*PI: How would you describe your practice of medicine?*

FP2: Part private practice and part teaching faculty, so I have a combination of family medicine and sports medicine, and I work for a private group, and also on the teaching faculty at the hospital.

*PI: Do you communicate with your patients via email?*

FP2: No.

*PI: Why not?*

FP2: My understanding is that it is actually and I just found this out it is not actually a HIPAA encoded, unless you have very, very strong server encryption it is not a HIPAA protected communication tool so you would actually be violating HIPAA by emailing someone to a Gmail or Yahoo account. That is not why that is part of why I would do it because I do not want to violate HIPAA. You have to set up certain boundaries in terms of how available you are for your patients and I don't give out my personal phone number or my email for any patient. Just for me, that is the standard that I use.

*PI: Does your practice use electronic medical records?*

FP2: Yes, we do.

*PI: Why?*

FP2: Practice management decision.

*PI: How many days a week do you schedule patient appointments?*

FP2: 4

*PI: How many patients on average do you see each week?*

FP2: 85

*PI: Also I would like to ask you a few more questions to allow me to better understand the characteristics of my interviewees.*

*PI: In what year were you born?*

FP2: 1977

*PI: In what year did you start practicing medicine?*

FP2: 2005

*PI: What is your gender?*

FP2: Male

*PI: What is your race?*

FP2: White

Thank you for agreeing to participate in this interview.

*(Turn off tape recorder.)*

### **Interview Three Transcript Family Physician Three**

Thank you for participating in this interview today. This interview should take approximately 30 minutes to complete. I would like to assure you that all of your responses will remain confidential. You will be assigned a participant code that will be used to maintain your anonymity.

*(Hand the participant the confidentiality agreement to read and sign with their participant code already entered on the form.)*

By signing the confidentiality agreement you have agreed that your responses may be recorded on audiotape and you are guaranteed that no personally identifiable information will be linked to your recorded responses.

*(Turn on tape recorder.)*

#### **Interview Questions and Answers**

*PI: List the steps you follow when interacting with a patient from the time you enter the examination room until you exit the room.*

FP3: Okay, starting with first the greeting, you know salutation introducing myself, usually they already have listed their chief complaint with the person that checked them in, so I just go over that chief complaint, such as, so I see you have, you know, the symptoms of a cold, and then I ask them to give me the history of that present illness, being like how long their symptoms have lasted, when they started, other associated symptoms, what makes the symptoms worst, what makes the symptoms better and that 's called the history of present illness and then if it applies you can ask them what their family history, social history is, for instance if they have chest pains you ask them family history of heart problems that they have or you ask them if they smoke that kind of thing, and then you go on with the exam and then you talk about it, you can come up with one, or if it is a clear cut diagnosis, you talk about what the diagnosis might be , what treatment options are and ask them if they have any questions and come up with a plan together of what they think and how they feel best about what their treatment should be and then that's it.

*PI: Do you use a computer in the examining room?*

FP3: Sometimes, but not always.

*PI: And what types of medical instruments do you use?*

FP3: In my *place of employment* setting usually it is just the stethoscope, the ophthalmoscope, and the otoscope. If they have hearing complaints you use tuning forks,



if they need to, often times I use the reflex hammer. That's during the general exam and we also have an exam table.

*PI: Do you record information into their medical record in the examining room?*

FP3: Sometimes but rarely in our setting. I do it while I am in the room with them or I go back out into my cubicle and I plug in things.

*PI: What is the main focus of your activity during the patient's examination in the steps you just listed?*

FP3: Primarily, I would say the patient's main complaint, the main focus would be to find out, listen to their symptoms and make your best guess, I think patient satisfaction is the main focus for the result of the treatment.

*PI: What is the main result or outcome you hope to have achieved when you exit the patient examination room?*

FP3: Patient satisfaction and hopefully the ability to help best fix whatever is wrong, certainly in the urgent care setting.

*PI: In the past 7 days, have any of your patients brought health information they found on the internet to their examination?*

FP3: Yes, but not in a paper form.

*PI: Was the health information your patient found on the internet directly related to their disease or condition?*

FP3: Yes.

*PI: Did you discuss the information with your patient?*

FP3: I did.

*PI: Where did the discussion occur in the steps that you outlined in the generic patient examination activity steps above?*

FP3: Very early during the very initial history of present illness, very, very early, maybe even when I first walked in, and said “So I see you have complaints, symptoms of a urinary tract infection”, right away and she responded yes I found it on the internet.

*PI: How many employees other than physicians do you work with in your practice?*

FP3: I would say roughly ten.

*PI: What are the titles of these employees?*

FP3: Nurses, Medical Assistants um, and administrative staff. And oh sorry, usually an X-ray tech that at our *place of employment* most of the time doubles as the lab person.

*PI: How do these other employees support the activity of examining patients?*

FP3: The nurse, well, the front desk people check them in and most of the time, list a very brief synopsis of what their complaint is, like most of the time we find when the patient comes in they say I have a sinus infection and they think they have already given us the diagnosis. Then the nurses call the patient in, they open up their office visit, check their blood pressure, temperature, weight if it applies, blood pressure, respiratory, oxygen saturation if that applies and they actually do some of the history gathering and find out what their symptoms are and then they put them in the room, and in our office they put the chart in the rack and we pick up the chart from here in the rack. And let’s see, I guess, what else do they do to support? They will administer shots, if they need an injection like a tetanus shot or whatever, for sutures they assist in getting trays together with our suture supplies, the x-ray techs when we put in an order in the computer for an x-ray, they go and get the patients out of the room, get the x-rays and bring them back to the room and the nurses at discharge time the instructions are printed out and the nurses they give the patients their prescriptions and they read the instructions and then they will check them out. Sometimes it depends on how busy they are and how long it takes but most of the time they will assist in checking the patients out.

*PI: Does your practice have a policy to refer patients to internet health information?*

FP3: No, I usually just refer them to [familydoctor.org](http://familydoctor.org).

*PI: Other than local, state, HIPAA and other federal laws what additional rules, guidelines, policies or procedures are you expected to follow when examining patients?*

FP3: None.

*PI: What does the phrase “patient health literacy” mean to you?*

FP3: To me that would just mean how well-versed the patient is of the particular symptoms that they have, and basically just how well-versed they are, their information knowledge.

*PI: How would you describe your practice of medicine?*

FP3: It is a privately owned urgent care center.

*PI: Do you communicate with your patients via email?*

FP3: No.

*PI: Why not?*

FP3: Because I guess, primarily in the urgent care setting we have no relationship with the patient. There would really be no reason to communicate with the patient. If they have a problem with what happened or how they were treated they call back and there is no formal communication directly between doctor and the patient via email in my office.

*PI: Does your practice use electronic medical records?*

FP3: Yes.

*PI: Why?*

FP3: I never thought about that. It was introduced to me and I assume it was to hopefully improve quality and efficiency which in my opinion it does not actually do. It does though help having the patient’s history on file and past treatment. Initially I think it was set up to avoid errors, but sometimes that is not the case at all.

*PI: How many days a week do you schedule patient appointments?*

FP3: 3 days a week

*PI: How many patients on average do you see each week?*

FP3: 25 patients each day depending upon how long the shift is.

*PI: I would like to ask you a few more questions to allow me to better understand the characteristics of my interviewees.*

*PI: In what year were you born?*

FP3: 1966

*PI: In what year did you start practicing medicine?*

FP3: 2006

*PI: What is your gender?*

FP3: Female

*PI: What is your race?*

FP3: Caucasian

Thank you for agreeing to participate in this interview.

*(Turn off tape recorder.)*

## **Interview Four Transcript**

### **Family Physician Four**

Thank you for participating in this interview today. This interview should take approximately 30 minutes to complete. I would like to assure you that all of your responses will remain confidential. You will be assigned a participant code that will be used to maintain your anonymity.

*(Hand the participant the confidentiality agreement to read and sign with their participant code already entered on the form.)*

By signing the confidentiality agreement you have agreed that your responses may be recorded on audiotape and you are guaranteed that no personally identifiable information will be linked to your recorded responses.

*(Turn on tape recorder.)*

### **Interview Questions and Answers**

*PI: List the steps you follow when interacting with a patient from the time you enter the examination room until you exit the room.*

FP4: Well, in general I go in the room, say hello, introduce myself, if they are new. Probably ask a few questions about them and start your interview to determine the reason why you are there today. Do the exam.

*PI: Do you use a computer in the examining room or any medical instruments in particular?*

FP4: No. When I do the exam part I use medical instruments stethoscopes, tongue suppressor.

*PI: So you said you referenced their medical chart. Do you reference like their lab results and diagnostic tests and those types of things too?*

FP4: Yes, jargon time. Yes, indirectly I say, I record it on a scrap paper, scrap is not the right word, it is sort of notation paper and it is dictated later.

*PI: What is the main focus of your activity during the patient's examination in the steps you just listed?*

FP4: I would say it is a combination, in regard to the patient I am trying to find the diagnosis of what they are worried about or about the problem or the question in front of them.

*PI: What is the main result or outcome you hope to have achieved when you exit the patient examination room?*

FP4: That is a tough one, the result or outcome. I am thinking of so many scenarios. The main thing is just hopefully maintaining the patient or to determine or address their specific problem.

*PI: In the past 7 days, have any of your patients brought health information they found on the internet to their examination?*

FP4: The past seven days I would say no.

*PI: What about the past thirty days?*

FP4: The past thirty days I would say maybe one.

*PI: Was the health information your patient found on the internet directly related to their disease or health condition?*

FP4: Yes, they usually bring information about their medication side effects.

*PI: Did you discuss the information with your patient?*

FP4: Yes.

*PI: Where did the discussion occur in the steps that you listed in your generic patient examination activity in Question # 1?*

FP4: Probably in the early part of asking the questions, interviewing, going over why they brought it in and before we got to the exam part.

*PI: How many employees other than physicians do you work with in your practice?*

FP4: 3

*PI: What are the titles of these employees?*

FP4: Office manager, receptionist and nurse assistant.

*PI: How do these other employees support the activity of examining patients?*

FP4: The office manager does not do anything to support examining, nor does the receptionist. It is mainly the nurse assistant. They take the blood pressure and weight and stuff or basics, the vital signs and those types of things to prepare you to examine them.

*PI: Does your practice have a policy to refer patients to internet health information?*

FP4: No.

*PI: Other than local, state, HIPAA and other federal laws what additional rules, guidelines, policies or procedures are you expected to follow when examining patients? And the reason I ask this question is so I know any other policies or procedures that I would not be aware of unless I asked you this question.*

FP4: I really don't know of any extra rules not covered, other than the standard policy of chaperoning, then that is the biggest rule we have other than those listed and everybody has that or should have it. I don't know whether that is local or state law or kind of general medical board practice.

*PI: What does the phrase "patient health literacy" mean to you?*

FP4: It is the general sense of patients being able to understand their disease or health concerns at a level in common with, what is the right word, their level of education in their words and they know what you are talking about.

*PI: How would you describe your practice of medicine?*

FP4: Solo, private practice.

*PI: Do you communicate with your patients via email?*

FP4: No

*PI: Why not?*

FP4: I just don't have the hardware to do it.

*PI: Does your practice use electronic medical records?*

FP4: No.

*PI: Why not?*

FP4: Do not have it because I have not invested in electronic medical records.

*PI: How many days a week do you schedule patient appointments?*

FP4: 4.5 days

*PI: How many patients on average do you see each week?*

FP4: On average, 75.

*PI: I would like to ask you a few more questions to allow me to better understand the characteristics of my interviewees.*

*PI: In what year were you born?*

FP4: 1958

*PI: In what year did you start practicing medicine?*

FP4: 1987

*PI: What is your gender?*

FP4: Male

*PI: What is your race?*

FP4: Caucasian

Thank you for agreeing to participate in this interview.

***(Turn off tape recorder.)***



## **Interview Five Transcript**

### **Family Physician Five**

Thank you for participating in this interview today. This interview should take approximately 30 minutes to complete. I would like to assure you that all of your responses will remain confidential. You will be assigned a participant code that will be used to maintain your anonymity.

*(Hand the participant the confidentiality agreement to read and sign with their participant code already entered on the form.)*

By signing the confidentiality agreement you have agreed that your responses may be recorded on audiotape and you are guaranteed that no personally identifiable information will be linked to your recorded responses.

*(Turn on tape recorder.)*

### **Interview Questions and Answers**

*PI: List the steps you follow when interacting with a patient from the time you enter the examination room until you exit the room.*

FP5: Okay, so normally I walk into the room and I'll strike up some small conversation with the patient, some small talk, and then I will sit down. And I usually dive in because I don't have a lot of time and I look at their electronic record, and after our small talk ask them what is going on, and what they are here for and give them room to talk, I usually don't interrupt them at first. Once they get their story out and I clarify any questions that I don't have from their initial story and make sure that they don't have any other things going on. And then I tell them kind of what I am thinking based upon what they have told me and I tell them I need to take a look at you and I get them on the exam table and do whatever exam I need to do. Then I have them to come off the exam table and talk to them some more, so they are sitting down, and I talk to them some more, and I tell them if they need more labs or medications or whatever I am thinking it is. And I will either put their medications into their chart and send it to the pharmacy or fill out their lab slips depending upon what the next step is. And then I usually tell them that I will give them a holler when I get their results back or whatever their follow up is.

*PI: Do you use a computer in the examining room to record information into their medical record?*

FP5: Yes, what I usually do is type in like what we call the HPI, that is kind of what they are presenting, if any prescriptions I will put that in. And everything else I will usually put in after the patients are gone like I will put in their physical exam.

*PI: Do you use any other medical instruments such as a blood pressure monitor, stethoscope?*

FP5: Yes, so the stethoscope I will use if I have to do heart, lungs or a belly exam I will use that while they are on the examining table, and if their blood pressure is up I will usually check it again instead of having the nurse to do it because it takes so much time.

*PI: What is the main focus of your activity during the patient's examination in the steps you just listed? Is it the patient, patient's health or diagnosis of the problem?*

FP5: I guess mostly I am trying to reassure patients. I am trying to make them reassured and comfortable. Obviously I want to get to the root of the problem.

*PI: What is the main result or outcome you hope to have achieved when you exit the patient examination room?*

FP5: I would like them to understand their work up and their treatment plan, a lot of times that will hold things up if they don't understand what I am talking about.

*PI: In the past 7 days, have any of your patients brought health information they found on the internet to their examination?*

FP5: Oh yes, they all do. Come on yea, I applaud you for you know researching. But yea, they all come across things on the internet.

*PI: Was the health information your patient found on the internet directly related to their disease or condition?*

FP5: A lot of times they will like put in a symptom online and then they will come up with a gazillion kind of differentials that it could be, so sometimes they get the target and sometimes it is so way off.

*PI: Do you discuss the information with your patient?*

FP5: Yes, I will kind of push them toward what we see most prominently as far as what their symptom is and then let them know why it is probably unlikely that it is something in the "zebra" category.

*PI: Where did the discussion occur in the steps that you outlined in # 1 for the generic patient examination activity?*

FP5: Usually it comes at the beginning, when they are kind of talking you know about what they are coming in with, and we kind of go over what they printed out or what they found and then I say let me do your exam first and what not, but this is what I am thinking as far as what they have printed out.

*PI: How many employees other than physicians do you work with in your practice?*

FP5: How many like number wise or what?

*PI: Yes.*

FP5: We have a huge practice at *name of employer*, oh gosh, so just in my little area, we have thirty, what I call nurses, they will either be a CNA or LPN or RN, we have one clerk who does all our referrals. We have three receptionists taking the patient's information in before they are seen. We have about four or five people in our lab and one or two doing x-rays and that is just in my little area so there are four little areas like mine.

*PI: The four or five people in the lab and the people taking x-rays what are their titles?*

FP5: Oh goodness, I just call them lab techs and radiology techs.

*PI: How do these other employees support the activity of examining the patient?*

FP5: How do they support it?

*PI: Yes or do they support it? Which ones support it?*

FP5: So, I suppose with time most of them do because they try to things in a timely manner. Our nurses, LPN or CNA, usually ask the chief complaint when they are taking the patient in, and then they usually will write on the form where they write their chief complaint like if they are due for any health maintenance stuff , like they need any vaccines and put their vitals in if something is un-normal that usually helps to direct us to it.

*PI: Does your practice have a policy to refer patients to internet health information?*

FP5: Does our clinic have a policy?

*PI: Yes, is there a particular policy that you have to follow as far as how you to refer patients to internet health information?*

FP5: No, there is not a written policy?

*PI: So there is no, one person who is designated to refer a patient to internet health information?*

FP5: No, but that sure would be nice. We need some time in the clinic. So it's usually I like have my certain web sites that I go to so I will show the patients where to go if they have access to a computer or I will print off some stuff.

*PI: How do you provide that information to them? So do you give it in the form to them, verbally or is it like a Word document or something that you printed out or a brochure?*

FP5: I will usually print it out, like as a Word document or I will write it down for them in addition to the Word document.

*PI: Are there any particular web sites that you frequent or direct them to?*

FP5: Um, I like to use familydoctor.org, that is the American Academy of Family Practice, and I use UpToDate patients. That is the patient section of UpToDate that they can get to and then I have handouts that you can get to electronically on our EMR and I will print them out.

*PI: Other than local, state, HIPAA and other federal laws what additional rules, guidelines, policies or procedures are you expected to follow when examining patients?*

FP5: None that I am aware of. If there is then I am not following it. I don't know of any other policies or anything.

*PI: What does the phrase "patient health literacy" mean to you?*

FP5: What it means to me is that the patient has some understanding of their diagnoses and their treatments and what we can do for their problem.

*PI: How would you describe your practice of medicine?*

FP5: Medical school, family practice clinic based at hospital.

*PI: Do you communicate with your patients via email? Probe: Why or why not?*

FP5: Yes, but it can be very time consuming.

*PI: Why?*

FP 5: I think it is really nice for the patient because they can get answers from me specifically versus having to go through a nurse but it is very time consuming because sometimes patients will send them at all hours. Sometimes I take hours answering everybody's email.

*PI: Does your practice use electronic medical records? Probe: Why or why not?*

FP5: Yes.

*PI: Why?*

FP5: Why, because you can't read doctors' handwriting. You know that is part of it. It is just easy system wide we can all share with all of the specialists that are in *name of employer* that are in there. So we can easily see what the patient is on and what procedures they have had done and it makes it easier for communication because we don't have to keep a separate record. It is also good to keep the patient's prescriptions and what not.

*PI: How many days a week do you schedule patient appointments?*

FP5: It varies, I usually have at least 4 half days and then sometimes I add on a fifth.

*PI: How many patients on average do you see each week?*

FP5: Probably about 40 to 50.

*PI: I would like to ask you a few more questions to allow me to better understand the characteristics of my interviewees.*

*PI: In what year were you born?*

FP5: 1975

*PI: In what year did you start practicing medicine?*

FP5: 2002

*PI: What is your gender?*

FP5: Female

*PI: What is your race?*

FP5: White

Thank you for agreeing to participate in this interview.

*(Turn off tape recorder.)*

## **Interview Six Transcript**

### **Family Physician Six**

Thank you for participating in this interview today. This interview should take approximately 30 minutes to complete. I would like to assure you that all of your responses will remain confidential. You will be assigned a participant code that will be used to maintain your anonymity.

*(Hand the participant the confidentiality agreement to read and sign with their participant code already entered on the form.)*

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*(Turn on tape recorder.)*

### **Interview Questions and Answers**

*PI: List the steps you follow when interacting with a patient from the time you enter the examination room until you exit the room.*

FP6: You know, that's an interesting thing because I come in with, I have a portable laptop computer on a cart that I bring into the room and actually another interesting thing is that my interaction with the patient doesn't really start when I enter the room because I review their charts in the morning before and actually create notes before I come into the room. My interaction actually starts early in the morning when I create a framework for my record keeping for each patient and I do that for everybody that I have scheduled for that day so their notes are structured to some degree and I modify them if I need to. So my actual counseling of the patient begins earlier. If they have been seen by colleague in the emergency room then I will review all that before they come. I review all the things on my agenda. Then I begin my agenda covers their chronic conditions. I have a fair amount of older patients since I am a family physician and a geriatrician and I have a fair amount of older patients with chronic conditions. We have electronic medical records and that helps to focus on all that. I bring in this type of cart and it is like my desk. It sort of goes up and down and I sit on a swivel chair or swivel stool. I sit next to the patient with the cart next to me. My patients usually like that and I usually have the chart opened up on their record when I come in the room so I don't have to fumble or do anything to put it up on the screen and I show it to them. So I usually come in and try to put them in a comfortable position. Then I ask them why they are there it is usually a chronic condition. I ask them if there are any questions that they have. That is sort of the steps I take initially. I will explore other issues that they have. Then I usually review some of their chronic issues and their medications to make plans for what they want to do whether it is changing medications or whatever follow up and laboratory work and things like

that. Then I usually do an examination or a physical exam and then we sort of get closure and wrap up our plans. That is usually what I do.

*PI: Do you use any other tools besides the computer in the examination room?*

FP6: Yes during the exam I use the regular tools and sometimes I use the Internet in addition to the EMR. I will lookup something on Up to Date and other material. Of course my EMR has resources built in with an enormous database that are all sorts of handout materials that are excellent that are part of our EMR that are excellent that will print out with our practice identification on it. The clinical guidelines are part of the medical center resources not for our electronic resource library for the medical school faculty. We have those that are available on my desktop too that I can pull up and use as part of a handout or patient education as part of the EMR material. And also I may just Google images or materials and I also have various texts that I use. I have a laptop that is wireless that is networked in the office I just take into the office. We do not have dedicated hardware in each examination room we just use our mobile laptop.

*PI: What is the main focus of your activity during the patient's examination in the steps you just listed?*

FP6: Are you talking about once we are done with the physical examination and that part of it particularly? Sometimes during the examination I am sort of confirming things it is a wound or sometimes it is just a brief cardiopulmonary event so I may be confirming positive findings or negative findings. The exam may be brief but sometimes I may be educating patients about chronic problems. I spend more time on the diagnostic dilemma if we do not have a focused final diagnosis so I may be looking for clues so it varies from patient to patient. I may be looking for a response to therapy. I do not use much technology during the exam I usually put the computer out of the way. I use more hands on time which patients like. That is a very important time. It is often not as labored. Most often I am dealing with a wound, wrapping a wound or dressing a wound or something like that. This has become a prominent part of the exam.

*PI: What is the main result or outcome you hope to have achieved when you exit the patient examination room?*

FP6: Often it is just addressing the agenda and the patient's questions or patient's expectations. I am often updating things about their chronic health problems that they are managing. Giving time to patients and give them educational material to help empower them for better management of chronic issues or sometimes addressing the other issues. It is a balancing issue for meeting their expectations for that particular meeting along with



their chronic issues. Episodic questions that are sometimes on the patient's minds but not as serious as their chronic condition I will address those. Also assessing information about their treatment, a planned approach and personal goals they have and what barriers there are to patients achieving their optimum management. Also I look at the barriers and how to get over those barriers by giving them more educational materials. Renegotiating a treatment plan with them and reassessing them. Renewing medications and making sure of their compliance, misconceptions about goals going over those, going over their plan and changing medications. There are a lot of steps that are part of that process.

*PI: In the past 7 days, have any of your patients brought health information they found on the internet to their examination?*

FP6: You know that is interesting that I don't know that people don't label it as from the Internet but they will say they got it from family or a neighbor. Certainly there have been multiple times. People seem less inclined to label it that they got it from the Internet.

*PI: Was the health information your patient found on the internet directly related to their disease or condition?*

FP6: Often that is the case, there is no question about that, it may be a side effect concern, it may be from the internet or TV and often they will say they found it in the newspaper. I get an equal number of patients who say they got it from newspaper sources, television sources, the internet particularly issues about side effects and a lot of questions about alternative medicine. In the last week or so I got a question about an herbal product or over the counter product for managing conditions. This last week I have gotten questions about managing menopause or hot flashes or sometimes even osteoporosis.

*PI: Do you discuss the information with your patient?*

FP6: Yes, but the amount of time I spend depends upon how many other issues we are dealing with. We try to put that into perspective with the other problems and concerns they have.

*PI: Where did the discussion occur in the steps that you outlined in # 1 for the generic patient examination activity?*

FP6: I would say it tends to occur before the physical exam usually, often later, but sometimes it occurs right at the beginning. That is usually when it comes. It may be when I bring up that particular problem. If I am reviewing their condition it may come up when

I mention diabetes high blood pressure or lipids. It is typical that they may bring it up in our conversation.

*PI: How many employees other than physicians do you work with in your practice?*

FP6: Oh how my goodness, it is complicated because we share a lot of employees with other practices. We have three MAs, radiology tech, lab techs, we do not have any RN's our practice manager is an LPN. We have nursing supervisors. We also have administrative personnel. We do clinical work and clerical work in our office

*PI: How do these other employees support the activity of examining the patient?*

FP6: The radiology tech has very focused work and the lab is very busy and they interact in a very confined way but my office assistants interact with the patients and they keep resources materials because we have an entire library that is separate from the EMR. They do lots of parts of the evaluation. They keep online information. Their involvement they actually are very involved with putting data into the EMR on an ongoing basis. They take the chief complaint. They also do a lot of call back to see how the patients are doing and interaction with patients. They are also the ones doing the phone interaction and do about 90% of the phone work for physician guidance and overview and they do a lot of the actual returning of messages. They also interpret a lot of our feedback to patients. They help out a lot and I will get my staff to call them back and the patients are used to getting calls from the staff. We have a patient portal as well that allows patients to see part of their charts. They can see their medication lists, scheduled appointments, request appointments and things like that.

*PI: Does your practice have a policy to refer patients to internet health information?*

FP6: No we don't really have a formalize policy. It is more or less just a practitioner style.

*PI: How do you provide that information to them? So do you give it in the form to them, verbally or is it like a Word document or something that you printed out or a brochure?*

FP6: We have handouts as well as online resources.

*PI: Other than local, state, HIPAA and other federal laws what additional rules, guidelines, policies or procedures are you expected to follow when examining patients? This is mainly for me to know if there is some guideline that I would not be aware of that the university requires you to follow.*

FP6: We have institutional guidelines that are standards and are just being developed. They are set up by the *name of employer* admissions group. They monitor getting back to patients for calls that are outpatient clinical guidelines, scheduling appointments like response time and routine appointments for our goals.

*PI: What does the phrase “patient health literacy” mean to you?*

FP6: It is obviously an important thing. I don’t use a standardized tool to assess that but I do individually assess that and most of our material is at a seventh or eighth grade level, so all of our materials are developed at *name of employer* for different levels of education and languages but there are people that need more basic levels than that. All of our EMR material is reviewed annually for its literacy level. That is something that I use and try to tailor that to an individual case by case basis.

*PI: How would you describe your practice of medicine?*

FP6: Yea, I have already answered some of it. Our practice is made up of the three physicians that I work with. The two women that work with me, we have sort of a hybrid arrangement and we are half and half in the clinic and other times in the medical school. I spend half of my time in the community clinic. That is the best that I can describe it.

*PI: Do you communicate with your patients via email?*

FP6: Yes.

*PI: Why?*

FP6: I have a few of them that I do but I try to encourage them to use our portal because it is secure and you can convert it to our EMR and it works better in terms of flow. I use email a lot for lots of things but I encourage them to use our EMR.

*PI: Does your practice use electronic medical records?*

FP6: Yes. We are totally paperless.

*PI: Why?*

FP6: We are changing from the system that we have had for about twelve years now to the *name of EMR vendor* system. They are not all integrated as much as we like so we are switching to a new system next year. Right now they are partially integrated but not as

much as we would like. Our outpatient system is all paperless. We have not used any paper in years. Most of our patients are all on our system. Most of our consultants are all in the same record so if they go to see a gastroenterologist then I can see all of those records. If they come from another regional hospital we may have a paper form. Now it is hard to go back to anything else.

*PI: How many days a week do you schedule patient appointments?*

FP6: It is about 5 or 4, sometimes four one week and five the next week, that alternates every week. Then I have clinical training where I also do training with clinical residents.

*PI: How many patients on average do you see each week?*

FP6: 10 to 12 patients per half day. We have only been in that practice for about two years and we are building that practice, probably my max is twelve when things are fully operating, right now it is averaging about ten.

*PI: I would like to ask you a few more questions to allow me to better understand the characteristics of my interviewees.*

*PI: In what year were you born?*

FP6: 1951

*PI: In what year did you start practicing medicine?*

FP6: 1977

*PI: What is your gender?*

FP6: Male

*PI: What is your race?*

FP6: White

Thank you for agreeing to participate in this interview.  
***(Turn off tape recorder.)***

## **Interview Seven Transcript**

### **Family Physician Seven**

Thank you for participating in this interview today. This interview should take approximately 30 minutes to complete. I would like to assure you that all of your responses will remain confidential. You will be assigned a participant code that will be used to maintain your anonymity.

*(Hand the participant the confidentiality agreement to read and sign with their participant code already entered on the form.)*

By signing the confidentiality agreement you have agreed that your responses may be recorded on audiotape and you are guaranteed that no personally identifiable information will be linked to your recorded responses.

*(Turn on tape recorder.)*

### **Interview Questions and Answers**

*PI: List the steps you follow when interacting with a patient from the time you enter the examination room until you exit the room.*

FP7: So I knock on the door, open the door, greet them with a smile, then I introduce myself and I sit down and ask them what they are here for today. We talk for a while and we have a conversation. Then I complete the exam. Then we talk about treatment options, come up with a diagnosis.

*PI: Do you use a computer in the examining room to record information into their medical record?*

FP7: Yes

*PI: Do you use any other medical instruments such as a blood pressure monitor or stethoscope?*

FP7: Yes, I also bring in my laptop, blood pressure monitor, otoscope, stethoscope. I usually read their medical record before I come in the room and I will point out the information. If they are interested in lab results I will bring it up on the computer.

*PI: What is the main focus of your activity during the patient's examination in the steps you just listed?*

FP7: Listening to the patient and addressing their needs.

*PI: What is the main result or outcome you hope to have achieved when you exit the patient examination room?*

FP7: The patient is more confident and informed about their condition.

*PI: In the past 7 days, have any of your patients brought health information they found on the internet to their examination?*

FP7: Yes.

*PI: Was the health information your patient found on the internet directly related to their disease or condition?*

FP7: Yes.

*PI: Did you discuss the information with your patient?*

FP7: Yes.

*PI: Where did the discussion occur in the steps that you outlined in # 1 for the generic patient examination activity?*

FP7: When the patient hands it to me. Sometimes they tell their story and they will bring it up at the conclusion.

*PI: How many employees other than physicians do you work with in your practice?*

FP7: Ten.

*PI: What are the titles of these employees?*

FP7: Front desk supervisor, office manager, radiology technician, phlebotomist, medical assistant.

*PI: How do these other employees support the activity of examining patients?*

FP7: Front desk people schedule patients in available appointment slots, pass on the information to the medical assistants about the patient's condition if known, for example if the patient is an alcoholic, because that may affect their treatment. Medical assistants sometimes talk to the phlebotomist about the patient's conditions.

*PI: Does your practice have a policy to refer patients to internet health information?*

FP7: No there is no policy but we do it a lot.

*PI: Who is designated to refer the patient to internet health information in your practice?*

FP7: I think each doctor has their own way of doing it. For me I will print out something from familydoctor.org. For example I will print out something on shingles and give them the printout. But today I was able to refer a patient to a web site for a fitness group in town because I had seen it advertised and knew the url.

*PI: Other than local, state, HIPAA and other federal laws what additional rules, guidelines, policies or procedures are you expected to follow when examining patients?*

FP7: North Carolina guidelines about physician/patient interaction. I don't think there are any *name of employer* guidelines and also just common courtesy.

*PI: What does the phrase "patient health literacy" mean to you?*

FP7: At what level the patient is able to comprehend the information you are giving them and their different levels of comprehension say if they are Spanish speakers, they may not be able to read the handout. That is a problem with a lot of the handouts because they are not at a literacy level appropriate for the patient.

*PI: How would you describe your practice of medicine?*

FP7: Newborn to 103, local family medicine clinic that is hospital affiliated.

*PI: Do you communicate with your patients via email?*

FP7: Yes, sometimes if they are *name of employer* employees.

*PI: Why?*

FP7: Because these patients can get my email address through the *name of employer* email system. I warn them that it is not really secure.

*PI: Does your practice use electronic medical records?*

FP7: Yes.

*PI: Why?*

FP7: We use the EMR because the health system is so spread out that it allows us to communicate more efficiently.

*PI: How many days a week do you schedule patient appointments?*

FP7: 5 days a week.

*PI: How many patients on average do you see each week?*

FP7: Well last month I saw 373 patients.

*PI: I would like to ask you a few more questions to allow me to better understand the characteristics of my interviewees.*

*PI: In what year were you born?*

FP7: 1976

*PI: In what year did you start practicing medicine?*

FP7: 2006

*PI: What is your gender?*

FP7: Female

*PI: What is your race?*

FP7: Caucasian

Thank you for agreeing to participate in this interview.

*(Turn off tape recorder.)*



## **Interview Eight Transcript Family Physician Eight**

Thank you for participating in this interview today. This interview should take approximately 30 minutes to complete. I would like to assure you that all of your responses will remain confidential. You will be assigned a participant code that will be used to maintain your anonymity.

*(Hand the participant the confidentiality agreement to read and sign with their participant code already entered on the form.)*

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*(Turn on tape recorder.)*

### **Interview Questions and Answers**

*PI: List the steps you follow when interacting with a patient from the time you enter the examination room until you exit the room.*

FP8: I knock on the door, I go in, I shake their hand or introduce myself if they are a new patient. If it is a routine follow-up from an existing problem, I ask them to tell me about their problem. I ask them some questions and I will answer their questions and I will tell them what I think is going on, what the possibilities are. I examine the patient. Then I will send their prescriptions to be filled and make sure they are comfortable and that they have a detailed plan and that once we are done they have a clear idea of their plan of treatment and then I leave the room.

*PI: Do you use a computer in the examining room to record information into their medical record?*

FP8: Yes, we are a private family practice that was bought by *name of employer* and right now there are two systems working in parallel. *Name of employer* tried to develop its own EMR and we have one for prescribing medications and another for patient information that includes call-ins, dictation and notes on specialists so anyone can access the EMR through the browser.

*PI: Do you use any other medical instruments such as a blood pressure monitor, stethoscope?*

FP8: Yes, we have stethoscope, otoscope, auroscope, reflex hammer, blood pressure cuff.

*PI: What is the main focus of your activity during the patient's examination in the steps you just listed? Is it the patient, patient's health or diagnosis of the problem?*

FP8: To make the patient feel comfortable.

*PI: What is the main result or outcome you hope to have achieved when you exit the patient examination room?*

FP8: The main outcome I hope to have achieved is that the patient understands clearly what is being communicated and whether I answered their questions.

*PI: In the past 7 days, have any of your patients brought health information they found on the internet to their examination?*

FP8: Yes, they will mention, I started looking at this or that on the web. It has been a long time since they brought a printout. A lot of patients will tell you about things they saw on TV or on the Internet.

*PI: Was the health information your patient found on the internet directly related to their disease or condition?*

FP8: Yes, it usually is and they are just bringing it and I try to reassure them. What it might be is a medication by product. Usually it is something like, I read this on the web and I wondered if I had this. They are trying to answer an acute question.

*PI: Did you discuss the information with your patient?*

FP8: Yes, it depends again on how much of it is just symptoms similar to theirs so it may be diverted until after I examine them. It depends on how much detail they have. If they do bring in a printout I can tell them what I think about the quality of the source.

*PI: Where did the discussion occur in the steps that you outlined in # 1 for the generic patient examination activity?*

FP8: Usually early on when I start asking questions about what brings them in to the office today. Once they bring it up I address it.

*PI: How many employees other than physicians do you work with in your practice?*

FP8: It is big now an ambulatory care and primary care office, run by *name of employer*,

so there are 15 other employees.

*PI: What are the titles of these employees?*

FP8: Nurses, medical assistants, office managers, lab techs, x-ray techs and referral clerks.

*PI: How do these other employees support the activity of examining patients?*

FP8: Half of them do. 1.5 FTE employees are just to handle referrals and medical records. Nurses just handle incoming patients and check them in, call them back and phone calls. X-rays are done at *name of employer* and nurses will see the report in the browser, usually sitting at the computer going through medications, fortunately the referral process is not usually done in person, when it is an intra-office task, or to see an oncologist, I will ask the patient what are good days or bad days for you and I just email that to the referral clerk, but the referral clerk is responsible for the diagnosis code, the medical assistant calls them back.

*PI: Does your practice have a policy to refer patients to internet health information?*

FP8: No we do not have a formal policy.

*PI: Who is designated to refer the patient to internet health information in your practice?*

FP8: In every exam room there is “quit smoking”, fitness, weight loss, hypertension or diabetes pamphlets, brochures or handouts. We give them these handouts that also have urls for websites printed on them.

*PI: Other than local, state, HIPAA and other federal laws what additional rules, guidelines, policies or procedures are you expected to follow when examining patients?*

FP8: We have to wash our hands, we have to be careful about protecting medical records and don’t leave them lying around but we don’t have a problem with that now with electronic medical records. We do have a policy where we have to push a button in a room and a light comes on for the nurse to come and pick up the patient’s order. I don’t know why that works better for them than me bringing it to them.

*PI: What does the phrase “patient health literacy” mean to you?*

FP8: I have never heard that term before. They are somewhat familiar with the language

that we use so it is easier for them to understand. The patients I see now are doctors, professors, computer geeks that I can speak a little more easily to about epidemiology. It is nice when I can explain things that they understand. I used to work in an indigent health center. I would say that patient health literacy means being familiar with the language that we use when I try to explain the concepts.

*PI: How would you describe your practice of medicine?*

FP8: Part of *name of employer*, primary care clinic, but we do not work in any hospitals nor are we restricted for referrals. However, we tend to refer to *name of employer* anyway because then it is easy to get to the information instead of waiting for something in the mail.

*PI: Do you communicate with your patients via email?*

FP8: Yes.

*PI: Why?*

FP8: There are two answers. Yes, a lot of time when we get lab results, if the patient has decided to participate in our patient portal, I send them an email with a link. Then they go there and see their results. It happens once in a while that a patient will email me but they have told us that the level of encryption for our email is not high enough. Also I do not check my email as often as a patient would like, so I may not see it for several days. It is easy for them to get my email address.

*PI: Does your practice use electronic medical records?*

FP8: Yes.

*PI: Why?*

FP8: They are developing our über system to replace everything that we are doing now.

*PI: How many days a week do you schedule patient appointments?*

FP8: 3.5 days

*PI: How many patients on average do you see each week?*

FP8: 70 to 75

*PI: I would like to ask you a few more questions to allow me to better understand the characteristics of my interviewees.*

*PI: In what year were you born?*

FP8: 1958

*PI: In what year did you start practicing medicine?*

FP8: 1987

*PI: What is your gender?*

FP8: Male

*PI: What is your race?*

FP8: White

Thank you for agreeing to participate in this interview.

*(Turn off tape recorder.)*

## **Interview Nine Transcript**

### **Family Physician Nine**

Thank you for participating in this interview today. This interview should take approximately 30 minutes to complete. I would like to assure you that all of your responses will remain confidential. You will be assigned a participant code that will be used to maintain your anonymity.

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*(Turn on tape recorder.)*

### **Interview Questions and Answers**

*PI: List the steps you follow when interacting with a patient from the time you enter the examination room until you exit the room.*

FP9: I come in and introduce myself or say good morning , good afternoon, glad to see you, and then, I have got the electronic medical record in front of me and so as I am doing this, I am opening up their chart, and as I open that up, I am looking at the reason that they are here, that is stated on their encounter sheet, that we have, that we mark the billing information, their return information for when to come back, and so I am looking at the reason that they are here, say follow up hypertension, for example. Then so I look at that so as I am opening up their chart, I will look at their blood pressure, their vital signs, their weight, oh you lost three pounds, boy that's great you know. Blood pressure is doing good, no blood pressure is up a little bit, maybe we need to double check that. Then I will ask them about their medicine, if they are taking medicine, or what their response to medicine has been, any concerns or other issues they have for today and then I kind of let them begin the process of what they came for or have. You know it is different depending upon different agendas. So if it's like a recheck hypertension I am kind of driving the agenda but if a patient comes in with complaints of fatigue or my shoulder hurts or my knee or I fell. Then it is a totally different, "Well how can I help you today?" kind of thing. Then I sit back, and I really try to, it is hard because you want to jump in because you are time pressured. I think I have heard the average physician jumps in within ten seconds and interrupts the patient. So I try not to do that. I try to let them tell me their story and I listen to their story until they either pause or start to repeat themselves. That's when I jump in. Then of course after you have their story you ask for any clarifying type questions. Oh now when did your knee start hurting? You try to get

the time sequence down or other issues that are surrounding their... When do you get chest pains? Do the chest pains bothering you when you are climbing up steps? Those kinds of things, so clarifying, then I do the exam, listen to heart and lungs. Whatever is appropriate for them examine their knee, their problems, and then I start discussing therapy, oh let's refill your medicines, you are doing good, no we need to add medicines here are some things to expect out of this new medicine. Oh boy, you twisted your knee and if you don't stop doing what you did to twist it, you are going to be right back here with the same issues here's ways to work on that. Then we schedule the appropriate follow-up and then I am out the door into the next room.

*PI: You mentioned that you opened up the electronic medical record, do you use a computer in the examining room?*

FP9: Yes, I have got a little tablet PC with a pen device that you can use as a mouse. That I can tap on the screen and it acts like a mouse. I am entering data into the computer as we talk, either I am typing it in for different things or it's kinda got this auto fill so if their exam is normal I can just tap and the heart and lung information just fills in automatically for normal stuff. You just tap on those kind of things. We have drop in boxes for cough and just tap those types of things. At a lot of times it is very minimal typing at all. Other times if I have got to enter more data, patient is in a car wreck, was rear ended, loss of consciousness, taken to the emergency room kind of stuff. Then I have voice recognition software so I will dictate that. Most of the time I do all of this stuff and interaction with the computer into the chart while the patient is right there in front of me so I am completely through with the record when I stand up and walk out of the room.

*PI: Do you use any other medical instruments such as a blood pressure monitor, stethoscope?*

FP9: Oh gosh, we have an office full of all of that stuff, EKG machine and a lot of equipment.

*PI: What is the main focus of your activity during the patient's examination in the steps you just listed?*

FP9: I try to listen to the patient because they will tell you what is going on.

*PI: What is the main result or outcome you hope to have achieved when you exit the patient examination room?*

FP9: That we have done things to improve the patient's health, modify their disease behavior, or alleviate their pain and suffering.

*PI: In the past 7 days, have any of your patients brought health information they found on the internet to their examination?*

FP9: Oh yes.

*PI: Was the health information your patient found on the internet directly related to their disease or condition?*

FP9: Sometimes yes, sometimes no, the latest is these lawyers are advertising for a diabetes medicine, *name of medicine*, that has been used for years, that has in the package insert about bladder cancer, so now they are advertising about that. So it is oh should I be on this or should I take this. It is a real time and unnecessary drain. Sometimes the patients act inappropriately such as oh I am going to quit taking that because it causes cancer.

*PI: Did you discuss the information with your patient?*

FP9: Yes. It is a unnecessary drain.

*PI: Where did the discussion occur in the steps that you outlined in # 1 for the generic patient examination activity?*

FP9: Most of that time there at the beginning when I am reviewing the medicine with them. They say oh I read about this or I saw on tv that *name of medicine* causes bladder cancer because I am reviewing their medicine with them. Generally in the beginning.

*PI: How many employees other than physicians do you work with in your practice?*

FP9: I am the only physician. There are two nurse practitioners, we have three nurse aides and six people that work in the business office.

*PI: How do these other employees support the activity of examining the patient?*

FP9: The primary ones are the nurse aides that work here in the back and they do all the support work. Say if I need to do some skin surgery they have got everything laid out for me so all I have to do is walk in and put on my gloves, skin's all prepped, lights are on, patient are there, walk in say hello and I can pick up the needle and start numbing them up. Now ours do a lot because with the electronic medical record it will automatically



flag that you haven't had a tetanus shot for example. So the nurses are given the standing order if the patient needs a tetanus shot then go on and give them a tetanus shot or a pneumonia vaccine. Now of course if I need thing sometimes I will step out of the room and go to the next room have them do an EKG so I can have two of those assistants working on patients while I am seeing a patient in the third room.

*PI: Does your practice have a policy to refer patients to internet health information?*

FP9: Yes and I have got links to all that on our web site, some high quality ones.

*PI: So who is designated to refer a patient to internet health information?*

FP9: Generally it is one of the three of us do that or we can direct our nurse to direct them to go to name of *web site* to start counting calories.

*PI: How do you provide that information to them?*

FP9: We just send them to our web site and I tell them not to go to the junk sites. There are people who do not have anything to do but write negative comments about stuff.

*PI: Other than local, state, HIPAA and other federal laws what additional rules, guidelines, policies or procedures are you expected to follow when examining patients? This is mainly for me to know if there is some guideline that I would not be aware of that the university requires you to follow.*

FP9: There is of course OSHA, CLIA, Clinical Labs Information Act, CLIA, they all regulate our labs to make sure we are following good laboratory practices. They come in once a year and we have to do that to do billing if we are doing a urinalysis or glucose test. Then the local fire marshal comes in and checks our fire extinguishers. And we get inspectors from Blue Cross, CIGNA, the different payers all come in and inspect and they are really looking for fraud. Did you really do an EKG on this patient did you have a reason to do it, did you document it and do it properly. There is the RAC and you really dread it if they are coming in because they are paid if they find any fraud and if they find anything they perform statistical analysis on that and calculate how many times you did that and if it is adequate for your level of charge.

*PI: What does the phrase "patient health literacy" mean to you?*

FP9: It means what they understand about their medicine and health. That is what it means to me.

*PI: How would you describe your practice of medicine?*

FP9: Private practice, but I am in the process of selling to name of *local hospital* because new physicians that want to come out of school and run their own business are just not out there anymore which just amazes me. The model of private practice is over.

*PI: Do you communicate with your patients via email?*

FP9: No I do not.

*PI: Why?*

FP9: I do not because of the complexity of it right now. The web site that we have has the capability of enabling email systems but right now we do not have it turned on but it would interact with our electronic medical records. There are so many steps that you have to go through to make that happen. It would be nice for me to be able to send an email to a client and it would be real beneficial and that is the next step that we hope to enable.

*PI: Does your practice use electronic medical records?*

FP9: Yes.

*PI: Why?*

FP9: It really enhances your ability to practice medicine cause, I can for example just click on say for example the patient's glucose, and it will graph it. Since we have been using electronic medical records since 2004 and it will graph it out since 2004. It is a wonderful tool, you are practicing better medicine, health maintenance. Medicine has gotten so complicated that you can't remember it all so if I prescribe a drug the computer keeps track of all the drug interactions. Ultimately it speeds you up even though originally it slows you down. I would not want to go back to paper and it is cheaper. And we have all this documentation so when we get audited you can just give them the information. They come back every year to audit and we don't get written up for it. It is a CYA tool.

*PI: Okay, how many days a week do you schedule patient appointments?*

FP9: 4.5 days

*PI: How many patients on average do you see each week?*

FP9: 4 per hour until 11:15, I should know this, how many is this? About 150 a week.

*PI: I would like to ask you a few more questions to allow me to better understand the characteristics of my interviewees.*

*PI: In what year were you born?*

FP9: 1952

*PI: In what year did you start practicing medicine?*

FP9: 1983

*PI: What is your gender?*

FP9: Male

*PI: What is your race?*

FP9: White

Thank you for agreeing to participate in this interview.

*(Turn off tape recorder.)*

## **Interview Ten Transcript**

### **Family Physician Ten**

Thank you for participating in this interview today. This interview should take approximately 30 minutes to complete. I would like to assure you that all of your responses will remain confidential. You will be assigned a participant code that will be used to maintain your anonymity.

*(Hand the participant the confidentiality agreement to read and sign with their participant code already entered on the form.)*

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*(Turn on tape recorder.)*

### **Interview Questions and Answers**

*PI: List the steps you follow when interacting with a patient from the time you enter the examination room until you exit the room.*

FP10: That's going to vary depending upon the type of visit that the patient is here for. The steps kind of vary with a routine visit versus a problem visit. So should I go through both of those? So for a routine visit, let's see enter the room, speak to the patient. I find out their concern they are here for a routine follow-up for a chronic medical problem or for a routine physical. Review their history, their complete history, their family history and all of that, review their medications and their allergies, um discuss any new problems, complete the exam, review any laboratory studies that they have had done and address whatever the problems that they are there for and then usually talk about health maintenance issues if they are there for a routine visit or a physical exam, health maintenance issues, diet and exercise, address smoking cessation if that's an issue, schedule any routine maintenance items such as mammograms, colonoscopy etc., so those are basically the steps for routine or physical exams. So problem visit is a little bit different. We ask so what are you here for today and we spend the majority of the time recording the history or the signs and symptoms, examining the patient, sending the patient for any x-rays or labs that they may need and then diagnosis and recommend treatment. I think those are the main things that are scheduled. Is that kind of what you want?

*PI: Do you use a computer in the examining room to record information into their medical record?*

FP10: Yes, I do.

*PI: Do you use any other medical instruments such as a blood pressure monitor, stethoscope?*

FP10: Yes, I use the laptop in the exam room so when I am interviewing the patient or talking with the patient, I am sitting down and entering history. Instead of writing that now I am doing all of that data entry into the computer. The nurse has already started a note into their vital signs, the weight, the blood pressure, the height if it is relevant, their vital signs, temperature, their vital signs they have already entered those into the computer, into the note for the day.

*PI: What is the main focus of your activity during the patient's examination in the steps you just listed? Is it the patient, patient's health or diagnosis of the problem?*

FP10: The history of what is going on.

*PI: What is the main result or outcome you hope to have achieved when you exit the patient examination room?*

FP10: To come up with a diagnosis of what is going on and to have a diagnosis and treatment set up for the patient about what is going on. Or if it is a problem resulting from a routine visit, to make the adjustments in medication and make sure that they are all up to date on their routine health maintenance and get that all in line.

*PI: In the past 7 days, have any of your patients brought health information they found on the internet to their examination?*

FP10: I don't think within the past seven days but definitely within the past thirty days.

*PI: Was the health information your patient found on the internet directly related to their disease or condition?*

FP10: Yes.

*PI: Did you discuss the information with your patient?*

FP10: Yes, I always discuss it with them.

*PI: Where did the discussion occur in the steps that you outlined in # 1 for the generic patient examination activity?*

FP10: Usually toward the end of the visit, that is usually when they pull out their stuff from the internet toward the end of the visit.

*PI: How many employees other than physicians do you work with in your practice?*

FP10: You mean on a daily basis? Seven.

*PI: What are the titles of these employees?*

FP10: Let's see, two receptionists, two LPNs, one RN, one Office Manager, one Physician's Assistant

*PI: How do these other employees support the activity of examining patients?*

FP10: Well that's mainly the receptionist don't do much of that activity but they actually do check out so they are responsible for some scheduling things when the patient leaves the office. The nurse are more involved because they get the patients from the front, bring them into the room, do the initial vital signs and again they get an idea, and again the record that information into the electronic medical record. And they also chaperone during exams for the male prostate exams and women's pelvic and breast exams so they support that too. The PA is independently seeing patients because that is what she does when she is here and the office manager doesn't do much in terms of the actual exam, she is just problem solving.

*PI: Does your practice have a policy to refer patients to internet health information?*

FP10: No we have a lot of stuff that we print off the internet but it is hard copy so we do not refer them to internet sites. We give them paper, no internet sites.

*PI: Other than local, state, HIPAA and other federal laws what additional rules, guidelines, policies or procedures are you expected to follow when examining patients?*

FP10: Not that I am aware of other than recommendations from your malpractice carriers regarding chaperones.

*PI: What does the phrase "patient health literacy" mean to you?*

FP10: I guess the ability of the patient to understand what you are communicating to them, and participate in their healthcare maintenance. I have never really heard that phrase before so I don't really know what that means.

*PI: How would you describe your practice of medicine?*

FP10: It is a private practice.

*PI: Do you communicate with your patients via email?*

FP10: No.

*PI: Why not?*

FP10: Because there is no gatekeeper, there is no barrier so the people that use it will bombard you. Direct communication does not work with me because there is no gatekeeper to protect me.

*PI: Does your practice use electronic medical records?*

FP10: Yes.

*PI: Why?*

FP10: We are able to communicate throughout the entire clinic and we are now able to communicate with the hospital, it just makes sense and it is better.

*PI: How many days a week do you schedule patient appointments?*

FP10: 4.5 days

*PI: How many patients on average do you see each week?*

FP10: 80 per week

*PI: I would like to ask you a few more questions to allow me to better understand the characteristics of my interviewees.*

*PI: In what year were you born?*

FP10: 1960

*PI: In what year did you start practicing medicine?*

FP10: 1989

*PI: What is your gender?*

FP10: Female

*PI: What is your race?*

FP10: African-American

Thank you for agreeing to participate in this interview.

*(Turn off tape recorder.)*



## APPENDIX E: PHYSICIAN HIERARCHICAL TASK ANALYSES

### Hierarchical Task Analysis: Family Physician One

#### Main Task Structure Chart: *Physician examining patient*

(Sub tasks of main task- Breakdown of subtasks-...)

1. **Enters examination room**-opens door-walks into room
2. **Communicates with patient**-greet patient-engages in small talk and general chat-asks patient what they can do for them today-listens to patient's chief complaint and history-discusses online health information patient presents
3. **Examines patient**-examines area of concern-examines other areas needed-asks more questions
4. **Communicates with patient**-reviews findings of examination with patient-discusses diagnosis-discusses treatment-instructs patient to make follow-up appointment
5. **References patient's medical record**-views electronic medical record-inputs prescriptions-inputs orders for lab tests (if necessary)
6. **Leaves examination room**-opens door to exam room-walks out-closes door

## **Hierarchical Task Analysis: Family Physician Two**

### **Main Task Structure Chart: *Physician examining patient***

**(Sub tasks of main task- Breakdown of subtasks-...)**

1. **Enters examination room**-opens door-walks into room
2. **Communicates with patient**-greet patient-asks them why they are there today-takes medical history-discusses online health information patient presents
3. **References patient's medical record**-reviews electronic medical record-inputs medical history into electronic medical record
4. **Examines patient**-examines area of concern-examines other areas as needed
5. **Communicates with patient**-explains diagnosis to patient-discusses lab results-discusses and/or develops a plan to help the patient
6. **Leaves examination room**-opens door to exam room-walks out-closes door

## **Hierarchical Task Analysis: Family Physician Three**

### **Main Task Structure Chart: *Physician examining patient***

**(Sub tasks of main task- Breakdown of subtasks-...)**

1. **Enters examination room**-opens door-walks into room
2. **References patient's medical record**-reviews chief complaint in electronic medical record
3. **Communicates with patient**-greet patient-asks about chief complaint-discusses medical history-discusses online health information patient presents
4. **Examines patient**-examines area of concern-examines other areas if needed
5. **Communicates with patient**-discusses diagnosis-discusses treatment options-asks if there are more questions from patient-discusses and/or develops a treatment plan
6. **Leaves examination room**-opens door to exam room-walks out-closes door

## **Hierarchical Task Analysis: Family Physician Four**

### **Main Task Structure Chart: *Physician examining patient***

**(Sub tasks of main task- Breakdown of subtasks-...)**

1. **Enters examination room**-opens door-walks into room
2. **Communicates with patient**-greet patient-asks a few questions about the patient in general-asks questions/interviews patient to determine the reason they are there today-discusses online health information patient presents
3. **Examines patient**-examines area of concern-examines other areas needed asks more questions
4. **References patient's medical record**-manually records medical history onto paper medical record
5. **Communicates with patient**-discusses diagnosis-discusses lab results and/or diagnostic tests if applicable-discusses treatment options-answers patient's questions
6. **Leaves examination room**-opens door to exam room-walks out-closes door

## **Hierarchical Task Analysis: Family Physician Five**

### **Main Task Structure Chart: *Physician examining patient***

**(Sub tasks of main task- Breakdown of subtasks-...)**

1. **Enters examination room**-opens door-walks into room
2. **Communicates with patient**-greet patient-engages in small talk-asks them why they are here today and lets patient tell their story-asks patients questions for clarification-discusses preliminary diagnosis-discusses online health information patient presents
3. **Examines patient**-examines area of concern-examines other areas if needed
4. **Communicates with patient**-explains treatment to patient-explains instructions for more lab tests if needed-explains medications if needed-tells patient they will contact them for any follow-up needed
5. **Reference patient's medical record**-inputs medications into chart electronically and sends to pharmacy-inputs lab test orders into chart electronically
6. **Leaves examination room**-opens door to exam room-walks out-closes door

## **Hierarchical Task Analysis: Family Physician Six**

### **Main Task Structure Chart: *Physician examining patient***

**(Sub tasks of main task- Breakdown of subtasks-...)**

1. **Enters examination room**-opens door-walks into room-brings laptop cart into room
2. **Communicates with patient**-greet patient-asks them why they are there-asks if patient has any questions-answers questions from patient-reviews chronic conditions-reviews medications and any changes to medication-reviews lab results-discusses online health information patient presents
3. **References patient's medical record**-reviews electronic medical record-inputs medical history into electronic medical record
4. **Examines patient**-examines area of concern-examines other areas needed asks more questions
5. **Communicates with patient**-explains treatment to patient-educates patient about chronic condition management-discusses and/or develops patient's plan of treatment/management
6. **Leaves examination room**-opens door to exam room-walks out-closes door

## **Hierarchical Task Analysis: Family Physician Seven**

### **Main Task Structure Chart: *Physician examining patient***

**(Sub tasks of main task- Breakdown of subtasks-...)**

1. **Enters examination room**-opens door-walks into room
2. **Communicates with patient**-greet patient-asks about health concern today-listens to patient's story-discusses online health information patient presents
3. **References patient's medical record**-reviews electronic medical record and/or lab results with patient
4. **Examines patient**-examines area of concern-examines other areas if needed
5. **Communicates with patient**-discusses diagnosis-discusses treatment options
6. **Leaves examination room**-opens door to exam room-walks out-closes door

## **Hierarchical Task Analysis: Family Physician Eight**

### **Main Task Structure Chart: *Physician examining patient***

**(Sub tasks of main task- Breakdown of subtasks-...)**

1. **Enters examination room**-opens door-walks into room
2. **Communicates with patient**-greet patient-asks patient to tell them about their medical problem-asks more questions-answers questions from patient-discusses preliminary diagnosis-discusses online health information patient presents
3. **Examines patient**-examines area of concern-examines other areas needed asks more questions
4. **References patient's medical record**-inputs data into electronic medical record with keyboard-submits prescriptions electronically to electronic medical record
5. **Communicates with patient**-discusses treatment and medications-discusses and/or develops plan of treatment
6. **Leaves examination room**-opens door to exam room-walks out-closes door



## **Hierarchical Task Analysis: Family Physician Nine**

### **Main Task Structure Chart: *Physician examining patient***

**(Sub tasks of main task- Breakdown of subtasks-...)**

1. **Enters examination room**-opens door-walks into the room with tablet computer
2. **Communicates with patient**-greet patient-asks about health concern today-  
comments on medical history in electronic medical record-asks questions about  
medications-listens to patient tell their story-asks clarifying questions-discusses  
online health information patient presents
3. **References patient's medical record**-reviews electronic medical record-inputs data  
into electronic medical record with stylus-submits prescriptions to electronic medical  
record
4. **Examines patient**-examines area of concern-examines other areas if needed
5. **Communicates with patient**-discusses treatment and/or therapy-discusses  
medications and expectations-discusses appropriate follow-up
6. **Leaves examination room**-opens door to exam room-walks out of the room with  
tablet computer-closes door

## **Hierarchical Task Analysis: Family Physician Ten**

### **Main Task Structure Chart: *Physician examining patient***

**(Sub tasks of main task- Breakdown of subtasks-...)**

1. **Enters examination room**-opens door-walks into the room
2. **Communicates with patient**-greet patient-asks about health concern today-reviews medical history-discusses medications-discusses any new health problems
3. **Examines patient**-examines area of concern-examines other areas if needed
4. **References patient's medical record**-reviews electronic medical record-reviews lab results-inputs data into electronic medical record with keyboard
5. **Communicates with patient**-discusses health problem-discusses health maintenance issues-schedules additional lab and/or diagnostic tests-discusses diagnosis-discusses recommended treatment-discusses online health information patient presents
6. **Leaves examination room**-opens door to exam room-walks out of the room-closes door

## APPENDIX F: PHYSICIAN EXAMINING PATIENT ACTIVITY DIAGRAMS

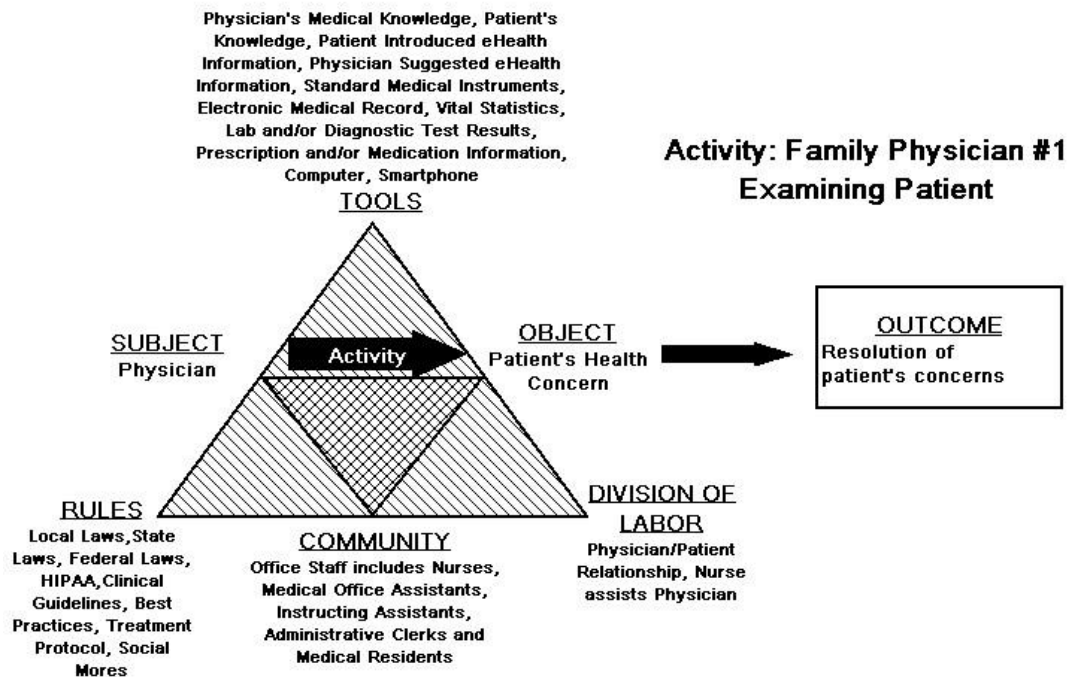


Figure 12. Family Physician 1 Examining Patient Activity Diagram

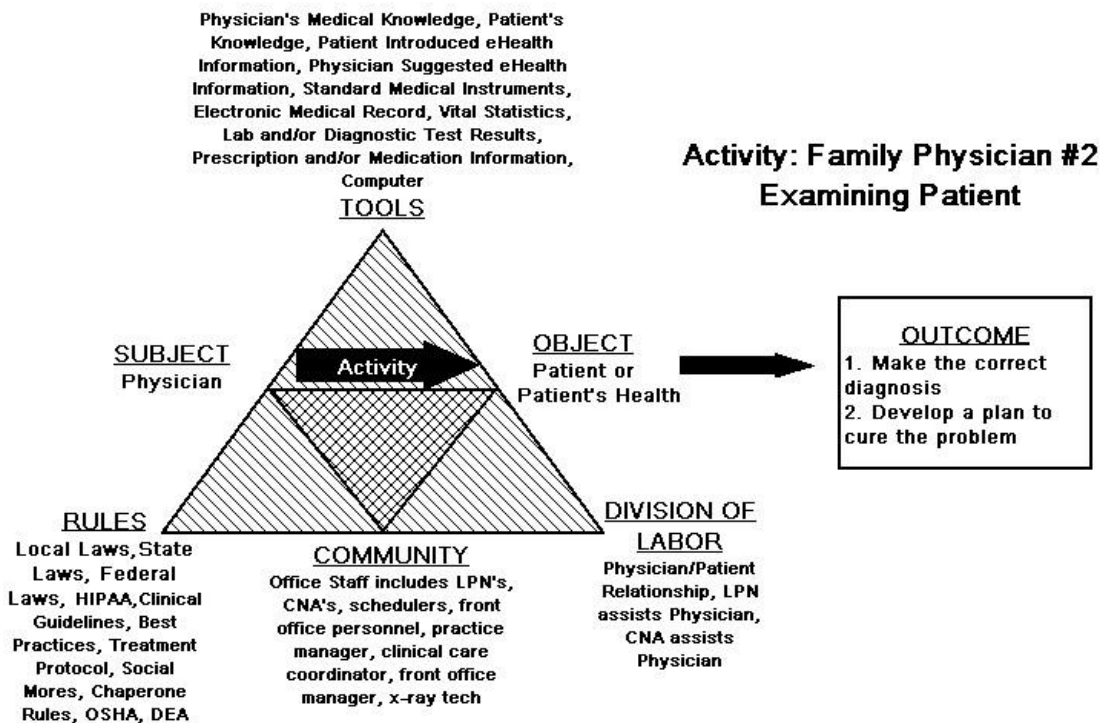


Figure 13. Family Physician 2 Examining Patient Activity Diagram

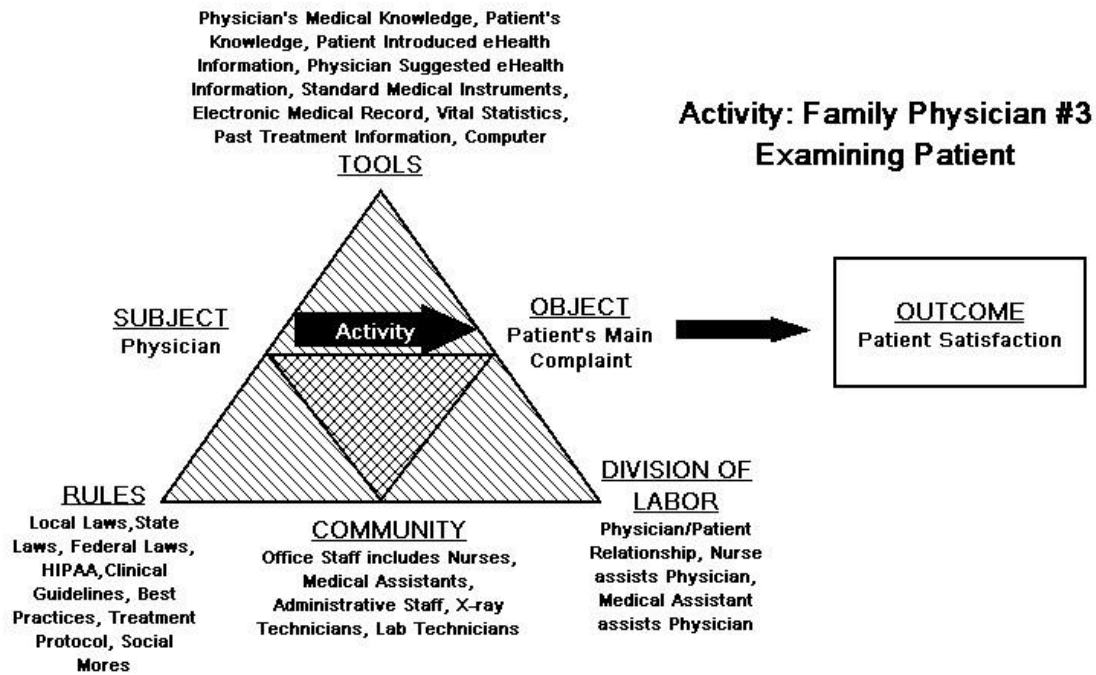


Figure 14. Family Physician 3 Examining Patient Activity Diagram

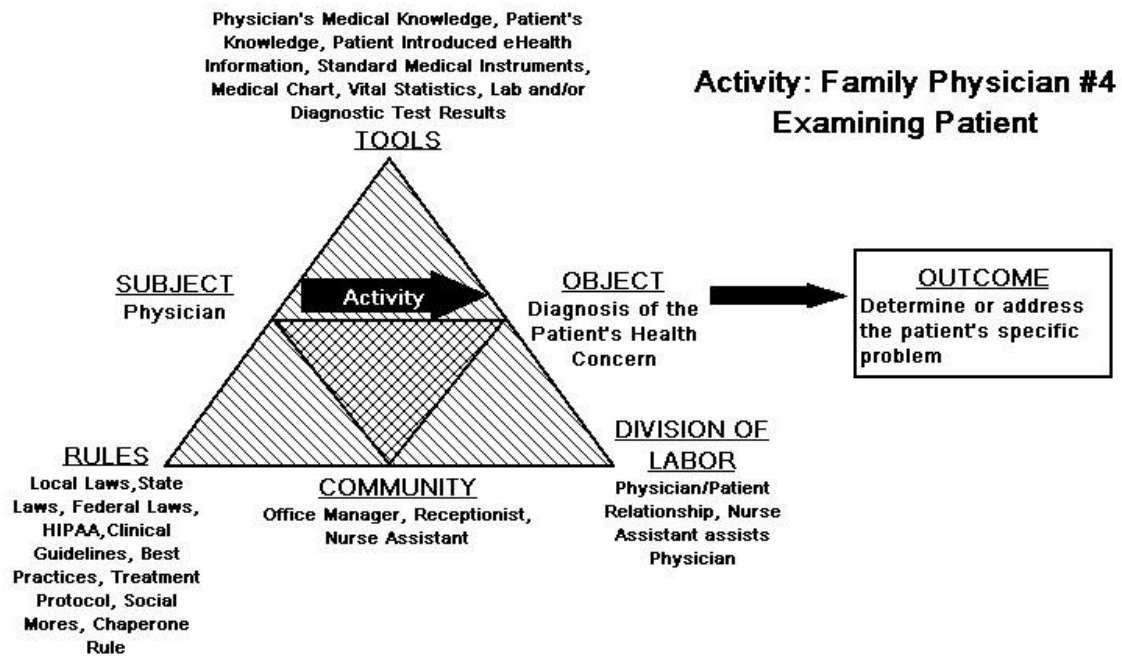


Figure 15. Family Physician 4 Examining Patient Activity Diagram

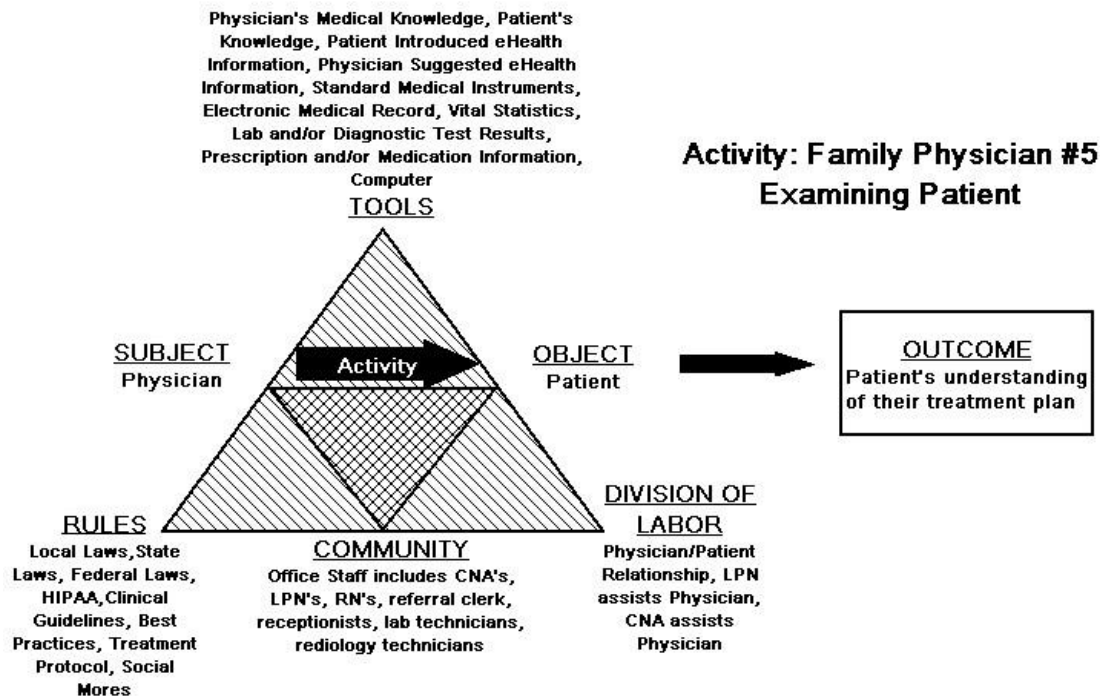


Figure 16. Family Physician 5 Examining Patient Activity Diagram

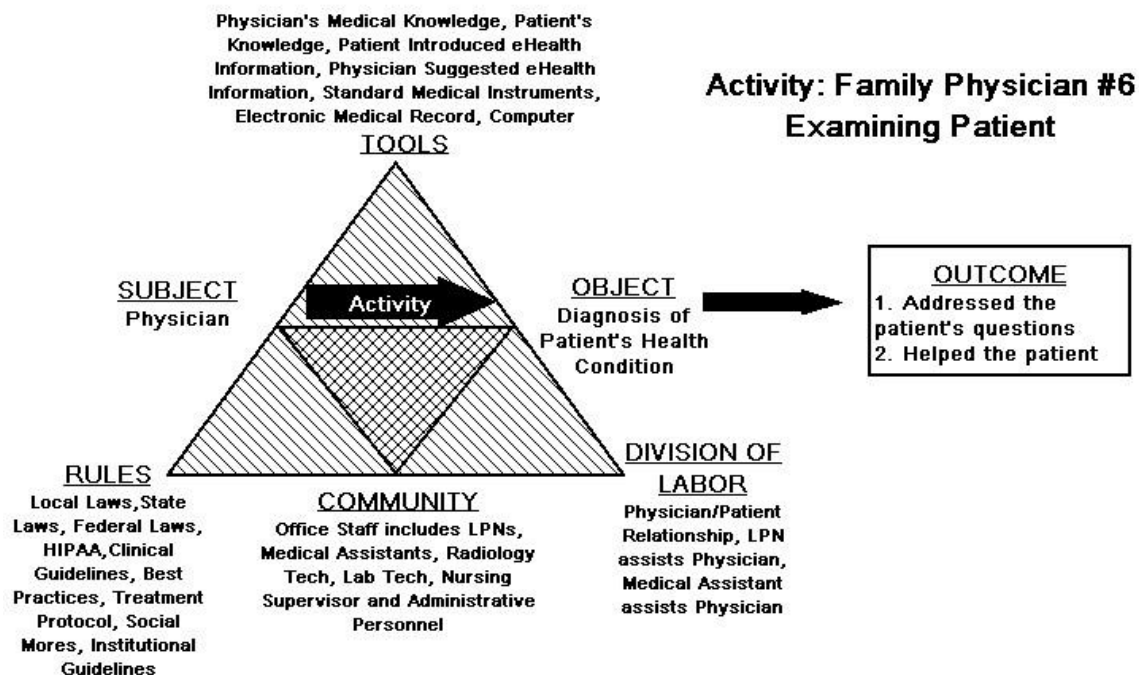


Figure 17. Family Physician 6 Examining Patient Activity Diagram

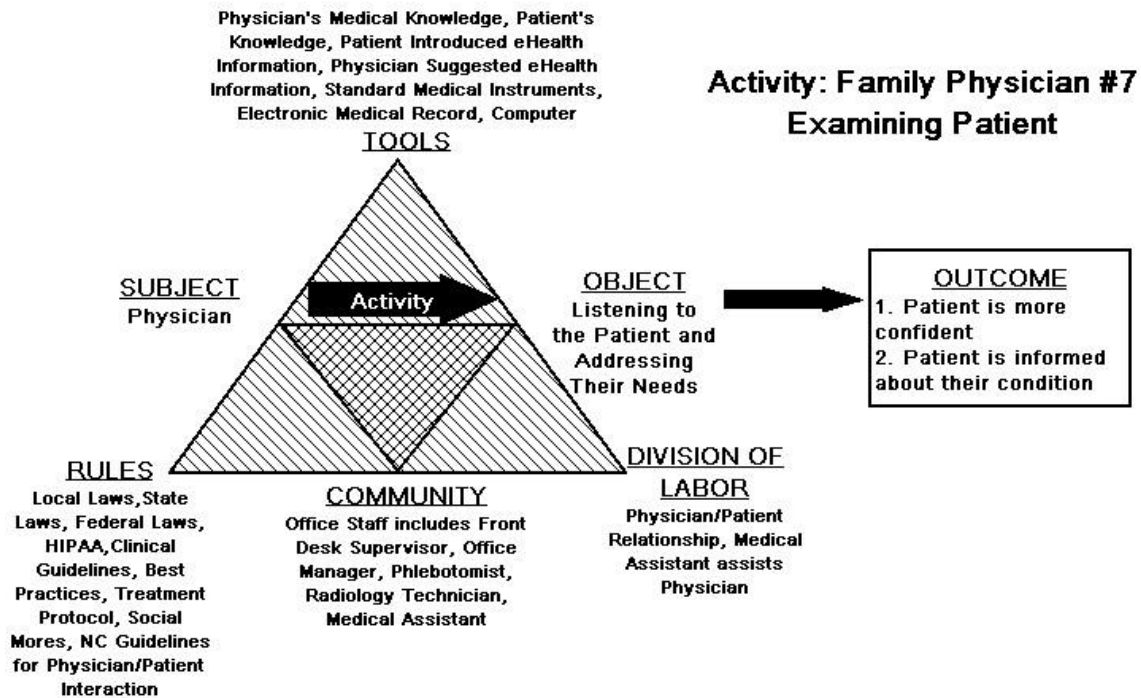


Figure 18. Family Physician 7 Examining Patient Activity Diagram

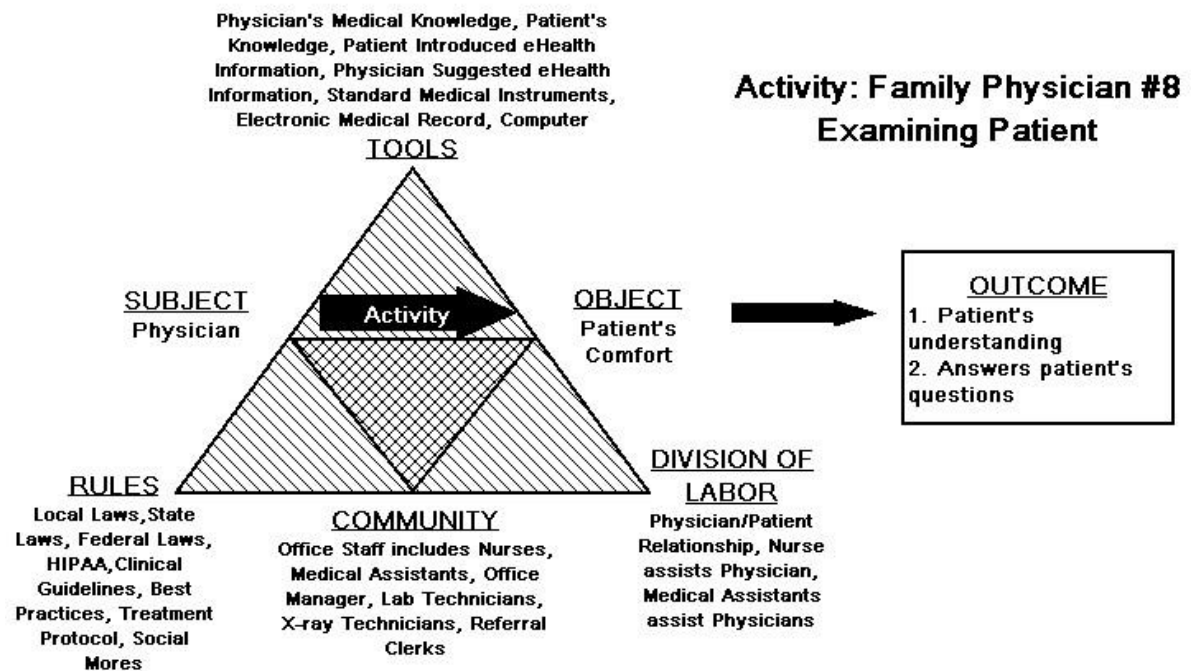


Figure 19. Family Physician 8 Examining Patient Activity Diagram

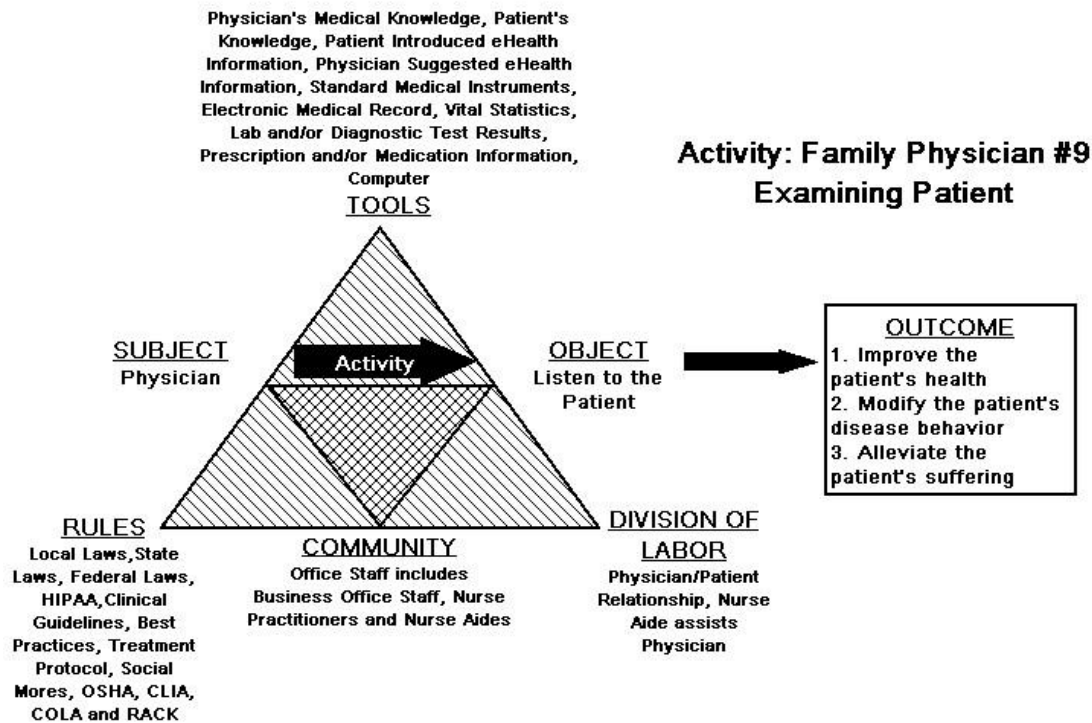


Figure 20. Family Physician 9 Examining Patient Activity Diagram

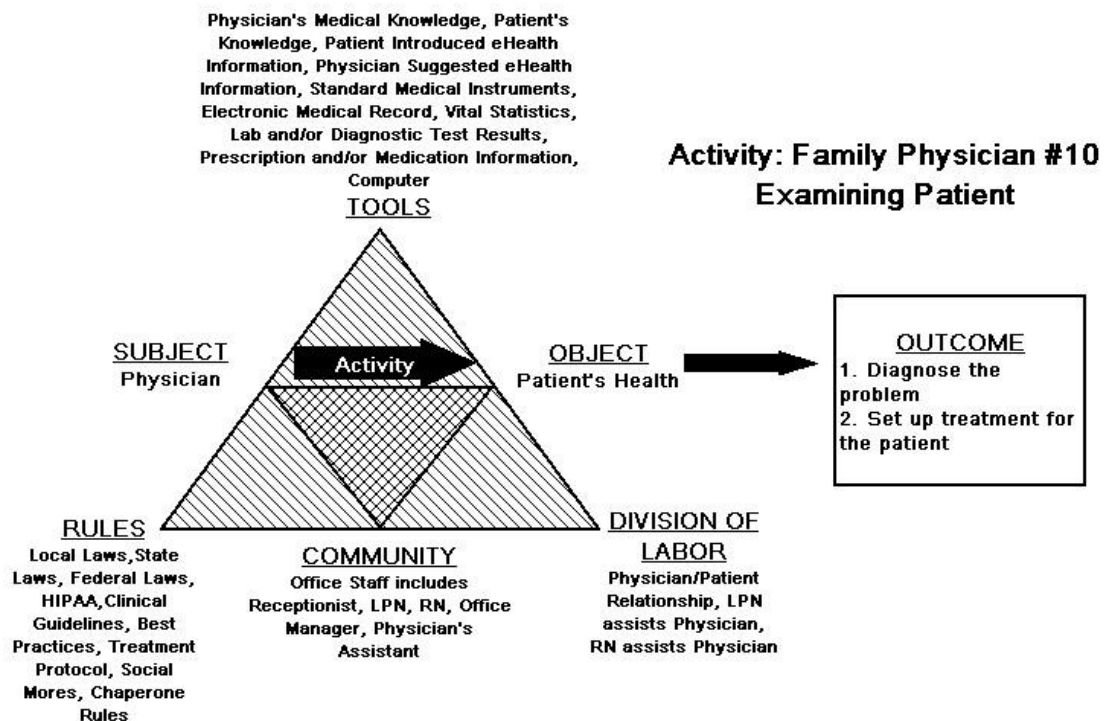


Figure 21. Family Physician 10 Examining Patient Activity Diagram

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